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## ORIGINAL ARTICLES.

### THE USE OF MODIFIED MILK IN HEALTH AND DISEASE.<sup>1</sup>

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SUCH great advances have been made in the use of milk as a food during the last few years, and so much interest has arisen among the members of the medical profession regarding this subject, that this would seem an appropriate time to discuss, at least provisionally, the position which milk-feeding holds at the present day. I should like to at once impress upon you as medical scientists, as practical and intelligent physicians, whether you are undertaking to provide for the nutrition of the earlier periods of life, or for the various phases of malassimilation, malnutrition, or gastro-enteric disturbance, in the old as well as in the young, that we are but in the beginning of our knowledge of a subject which, broad as it has appeared in the past, has tripled and quadrupled within a decade, and now opens up long vistas for future thought and research. We are not in a position to-day to say exactly what are the best modifications of milk to be used in all the manifold instances in which some modification is evidently indicated. We have learned that to modify milk is a wise and valuable adjunct to our treatment, and, in certain instances, what combinations of the constituents of the milk are best for the individual case.

From the milk laboratories of New York, Buffalo, Providence, St. Louis, Montreal, Chicago, Philadelphia, Baltimore, and Boston, we have already had thousands of people of all ages fed. From these laboratories have emanated thousands of prescriptions, written by over 2000 physicians. I have prescribed for a large number of individuals, but I do not feel, excepting in a limited class of cases, that I can tell you what should be prescribed for a special individual. When we consider that hundreds of physicians have been prescribing from these laboratories who have never spent a day, or even an hour, in really learning how or when the various combinations of the constituents of the milk should be given, is it any wonder that we should hear of failures in the individual treatment?

Looking at the subject as a whole, however, what stronger evidence can we have of the value of the principle that different individuals, both in health and disease, require different combinations of the constituents of the milk to suit their especial case than that, with all the ignorance of the prescriber working against the prescription, still, the result is that in a vast majority of instances the patients have done well? The position which it seems fair for us to take is that the principle of the modification of milk is scientific, is practical, is right, and that in the milk laboratory we have one more instrument of precision to aid us in our work, and that in all probability the failures are not to be attributed to the principle and the instrument, but to us, who, acknowledging the principle as a whole, and using the instrument, are as yet ignorant of the details which make up that principle and do not do the instrument justice.

What have we accomplished in our investigations of this subject? Where do we stand? In what direction should we work in the future? There is no doubt, in my mind, that the true and only way of approaching the problem of feeding is by turning the searchlight of scientific experimental investigation upon every one of the old ideas which time and tradition have imbued us with, and see whether these ideas and traditions will stand the test. A wise and complete iconoclasm is surely what we need to prepare a firm basis on which to build up a more rational system of feeding than has ever been dreamed of in the past. Dogmas, even though supported by the names of some of our most revered teachers, must be put aside if they do not stand before our modern methods of research. It will not satisfy us, because our predecessors said so, to claim that cereals in the milk lessen the size of the curd, if it has been proved in the chemical laboratory that they do not. It will not do, because supposed authorities have said that separating milk into its component parts destroys the emulsion, to accept this fanciful statement when, by means of photography, it has been proved that it does not. It will not satisfy us that because the expert chemist has told us that the proteids in human milk average 1 to 1.50 per cent. to therefore insist upon feeding infants on 1 per cent. of proteids when clinical evidence, combined with chemical analysis, teaches us undoubtedly that what is true and good for the

<sup>1</sup> Read before the New York Academy of Medicine, February 18, 1897.

average may be false and productive of harm to the individual, and that the secret to the correct management of the proteids is the new principle that variety, and not uniformity, produces the best results.

In contradistinction to those who claim that a given percentage should be given at a given age, we can show, by means of analyses made in the different months of lactation, and in different individuals, as seen in the accompanying table, representing a number of good human milks from mothers whose infants were thriving, that we must study the proteid digestion of the individual infant and discover the idiosyncrasy of the especial stomach.

#### HUMAN BREAST-MILK ANALYSES.

(Mothers healthy and infants all digesting well and gaining in weight.)  
[Harrington.]

Constituents.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.
Fat.....	5.16	4.88	4.84	4.37	4.11	3.82	3.80	3.76	3.30	3.16	2.96	2.36	2.09	2.02
Sugar.....	5.68	6.20	6.10	6.30	5.90	5.70	6.15	6.95	7.30	7.20	5.78	7.10	6.70	6.55
Proteids.....	4.14	3.71	4.17	3.27	3.71	1.08	3.53	2.04	3.07	1.65	1.91	2.20	1.38	2.12
Ash.....	0.17	0.19	0.19	0.16	0.21	0.20	0.20	0.14	0.12	0.21	0.12	0.16	0.15	0.15
Total solids.....	15.15	14.98	15.30	14.10	13.93	10.80	13.68	12.89	13.79	12.22	10.77	11.82	10.32	10.84
Water.....	84.85	85.02	84.70	85.90	86.07	89.20	86.32	87.11	86.21	87.78	89.23	88.18	89.68	89.16
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

On examining these analyses you will observe that the percentage of the proteids varies greatly, and in only one case approaches one per cent. In a number of these cases where the infant which was thriving on one of these milks was changed to another, it ceased to do well, and suffered from acute indigestion. This at once opens up the question of the various artificial foods, and whether it is worth while to use them. There are only certain food elements which can be made use of, no matter what food as a whole is demanded. The artificial foods, if well made, should be unvarying. We all know that they must vary. If they vary, we must at once give up any idea of feeding with exact percentages of the different constituents of the food. Even if they do not vary, do we know enough about the exact percentages of these constituents to calculate how, in the completed whole, as mixed for the patient, we can give just such percentages as we deem best for the individual? That is, the *elements* of the food may be there, but the *combination* we do not get in any near approach to exactness.

Our investigations teach us that variety and comparatively exact combinations constitute the true principle of successful feeding and a resulting perfect nutrition. Is it not better to entirely put aside an uncertain conglomeration of the constituents of the

food represented by these artificial foods and substitute in its place an exact method of combining these same constituents? Is not this the only intelligent and indeed practical method of dealing with such a difficult question as malnutrition?

There is very little question, but that by the careful mathematical calculations which are made by means of the Walker-Gordon laboratory tables, that at least more exact combinations of especial percentages of the constituents of food can be made than ever before. What is of equal importance also is that by these tables we enunciate the great principle in feeding, namely, that *variety* to suit the individual digestion is required and can be obtained by a simple

prescription of a few figures; also, that an almost unlimited number of different combinations of the constituents of food can be made by the physician in as many minutes, and by the laboratory in as short a time, according to the number of clerks employed. I use the word "laboratory" simply to cover the idea of the principle involved. The changes in the percentages may be made by home modification; not so well as by the laboratory methods. Still, there are those who like to argue the question of their own peculiar way of arriving at correct results in home modification, disregarding the fact that to obtain an exact combination of the constituents of the food needs skilful mechanical training, as well as a correct calculation of figures, and that the personal equation of mother and nurse at home is often a serious drawback to the successful mixing of the food, for this mixing cannot be, in the vast majority of cases, so well done by mother and nurse as by the trained clerk in the laboratory. There are many other obstacles to the success of home modification which may arise. For instance, on four successive days here in New York, at the same reputable dairy, I had the request made to give me for purposes of home modification, for a sick infant, an unvarying cream. This cream, obtained from an honest, conservative dealer, I had tested each day, with the result of find-

ing a variation in the percentage of fat from 10.13 to 28.34, which, of course, would at once preclude any chance of obtaining an unvarying percentage of fat in the mixture as given to the patient.

I have spoken of the uncertainty which arises when the physician endeavors to carry out an exact modification at home from the varying percentages of purchased dairy cream. But I have also found the "top milk process" (as it is called) also very uncertain. Milk set for the raising of cream by gravity, whether in an open pan, a jar, or a Cooley can, will vary with differences in the atmosphere or in the medium in which it is set. With great attention, though, the night or evening milk can be creamed in ten hours, with some degree of regularity in percentage. But it needs attention every fifteen minutes during this time. Open pan and jar setting is uncertain in its results, so that, unless debarred from access to a scientific laboratory, the physician cannot hope to obtain any great degree of exactness by home modification. The percentages of the sugar and the proteids will also vary from day to day in about the same way, though to a less degree than does the fat. A predetermination of the milk each day before modification by the usual dry process is indispensable to exactness in modification. This is expensive and tedious.

I wish also to speak briefly about the important question of employing for all infant feeding a safe milk. A safe milk is hard to obtain from the farm or dairy, and is especially hard to obtain in the private stable. A safe milk is a matter of the producers' conscientious work. The veterinarian must be constant in attendance to guard against such a common danger as tuberculosis. But perhaps the danger of infection in milk from this disease is very slight compared with danger of infection from other sources. Typhoid fever, diphtheria, and scarlet fever are easily transmitted by rinsing water, by the milker's hands and clothes, and by other common sources of dairy infection. These are common sources of danger, and yet perhaps not so dangerous as more subtle sources which lie outside of the observation of the physician who has charge of the modification. The rôle which the streptococcus pyogenes plays in infant pathology is very uncertain, and its virulence varies in any given instance. Yet it is beginning to be believed that this so-called non-pathogenic coccus becomes highly pathogenic in certain company, and that milk containing these cocci, which are quite commonly present in average dairy milk, becomes at times especially dangerous to the consumer. The experiments of Nivens in 160 cases, of Kruger (1890), of Guillebeau in seventy cases, of Karluiske, Esch-erich, Longard, Adamitz, Stokes, Bullock, Tonarelli,

Ceveiuville, Taval, and especially Booker, all connect severe diarrheas in infancy and acute gastroenteritis with the presence of this organism.

Of especial interest in this connection are the observations of Stokes and Clement on a herd of seventy cows who were infected by the hands of a strange milker, who had had one of his fingers infected when working on a large dairy farm in York, Pa. A complete autopsy made on one of these cows showed that there was no general infection, but that the septic process was limited to a somewhat purulent inflammation of the milk ducts. Dr. Stokes also traced the source of an epidemic of diarrhea which broke out in a school of seventy girls, to milk from cows infected with this local sepsis. These opinions are to be taken for what they are worth in the individual mind of the physician, but the fact cannot be ignored that in nearly all farm, dairy, or private stables, the milk produced very commonly contains large numbers of these organisms. The fecal matter from the cow is a constant source of danger, and is present in nearly all the milk of commerce, while a direct pus contamination often occurs.

Of course, with great care and perfect supervision home modification may be done with more or less exactness and safety, but this entails a large amount of personal responsibility, which is guaranteed to the patient when the infant is fed from the laboratory by prescription, both as to the primal milk employed and as to the accuracy with which the prescription is filled.

In like manner there are physicians who, in their cry of *cheap* food for the people, do more toward injuring the cause of *proper* food for the people than any class that I know of. According to my own experience, it is the people of moderate means, and even the poor, who most appreciate the advantages of feeding by exact methods, and that it is the rich, aided and abetted by physicians ignorant of the rudimentary laws of physiology and development, who are continually preaching economy in regard to the most important factor in the problem of perfecting the human race through its nutrition; and it is this same class who uphold far greater expense in other branches of medicine. A good thing costs and should be paid for. Money is not ill-spent in developing in the best way those who must make and use that money in the future. The importance of this self-evident truth should be impressed on the people by physicians. Antitoxin is not withheld from the man of moderate means because it is expensive; its employment is the best for the patient, and he gets it, whatever his means may be. The infant, with its low vitality and its high mortal-



ity rate, should have the best means for reversing these rates, in the midst of its struggle for life. Let not the millions spent in charity be given entirely to the treatment of disease. Let some of it go to the cause of prophylaxis in the early periods of development, and to the proper management of the nutrition which, in the young, will do more to withstand disease, when it comes, than pounds and quarts of drugs.

Although I cannot as yet give you exact rules for the modification of milk in health and disease, I cannot help feeling that, from the large number of cases which I have treated in this way, certain impressions which I have derived from watching carefully the results of this treatment may be of some use to those of you who are working in this field of medicine. I shall not discuss such a side-issue as the use of cereals in a food for the early months of life, as it is the food which nature provides, containing certain elements, and no others—fat, sugar, proteids, salts, and water, which we are at present considering. In regard to the proteids, however, I would draw your attention to the fact that careful experiments have been carried out which show that, no matter what cereal or artificial food is added to milk, the size or density of the curd is not diminished. I would also state that in both health and disease, both in the infant, child, or adult, with the exception of a few especial cases, I have personally found that I am more successful in managing a difficult proteid digestion, not by predigesting the proteids, but by reducing them first to a minimum and then gradually, as the proteid digestion becomes stronger from not being overtaxed, increasing the proteid percentage until the amount necessary for nutrition is attained. Thus, beginning with the proteids 0.25 for all ages, whether infant, child, or adult, I increase up to 1 to 1.50 for infants, 2 to 3 for children, and 3 to 4 for adults.

It may, perhaps, be of some significance also to state that in making a careful analysis of 164 fully recorded cases treated at the Boston Walker-Gordon Laboratory, I have found a decided reduction in the percentages employed, amounting to at least fifteen per cent. during the last two years, in comparison with the high percentages used in the previous two years, and that during the same two years here in New York the same reduction has been found in the prescriptions sent to the laboratory by the New York physicians. That is, we are learning that low percentages, if carefully adjusted, produce better results than beginning with high ones. I have also found, somewhat to my surprise, that a critical review of my own prescriptions shows that my tendency has been to increase the proteid percentage much more

slowly than in former years, and that I arrive at the percentage of 4, which is that of cow's milk, rather after the twelfth month than at or before that age of the infant. In private practice also the rule has been that in summer the most successful treatment of diarrheal cases has been with low percentages of all the elements of the milk, the average percentages being: Fat, 1.50 to 2.50; sugar, 4.50 to 5.50; proteids, 0.25 to 0.67.

I would also say that in modifying milk and carefully using the many different combinations at our command my experience does not accord (except in a very limited number of cases, and those arising probably from my own ignorance of the instrument I was using) with the experience of those who believe that certain individuals cannot take milk, or that milk is contraindicated in certain diseases. All foods contain practically the same constituents, and milk, or milk mixed with starch, comprises all these constituents. The individual does not reject milk, or suffer from malnutrition caused by the administration of milk. Milk is not contraindicated in an especial disease; on the contrary, it is some element, or constituent, or combination of the constituents making up the milk, wherein the fault lies. We might just as well at once, and better, too, because we can do it more exactly and more simply, find out by changing our modification whether it is the fat, or sugar, or proteids, or total solids, or starch digestion which is weak or diseased, or which, as a culture ground, will encourage bacterial growths in the individual. We can then remedy the trouble by not overtaxing the especial function until it has had time to recover its normal power. The great mistake which those make who experiment with foods is that they look upon the different foods and their action and effects in health and disease as a whole, and not at the details which make up this whole. Milk, as a whole, is a mild and simple dinner made up of the same food-constituents as are placed on our tables, excepting that in it we have the starch predigested into sugar. One individual can thrive best on an excess of vegetable food, another on fats, another on meat, and this idiosyncrasy of the individual in early life and in disease in later life can be met by simply modifying these food-constituents in the milk.

While studying the question of whether separating the fat from milk, and then recombining it in various percentages, might possibly produce any great change, such as a disturbed emulsion, and thus injure the food in some way, I had photographs taken of (1) cow's milk, (2) of cow's milk separated and recombined, (3) of human milk, and (4) of a modified milk of the same percentages as the human milk.



There does not seem to be such a perceptible difference between the resulting emulsions in these specimens as to make one believe that any difference exists between unseparated milk and the same milk separated and again combined.

In a fairly large experience derived from the care of infants who have been fed from the first days of life among people who have had sufficient means to give their children the best hygienic surroundings, I can state that I have never yet seen an infant who was carefully fed on milk during the first ten or twelve months of its life, by carefully changing the percentages of the milk constituents, and on nothing else, not enter upon its second year with firm flesh and an average development. I have found the teeth to be sound, and to come at the usual age. I have found the functions of sitting, walking, and standing, and the amylolytic function all appear and develop normally. I have followed these children into their third, fourth, and fifth years, and have found them strong, ruddy, with good bones and teeth, and with digestions which permit them to be fed on a general mixed diet of all the food elements.

Where I have been especially struck with the value of the idea that we should think, write, and speak in percentages representing the constituents of food, and not prescribe foods as a whole, is in the feeding of premature infants. Here we have a stage of development which peculiarly illustrates the principles of milk modification. In this early period of development, not only are the lungs and heart immature and in need of a carefully modified air, but the gastro-enteric tract is also undeveloped in its size and functions; it needs smaller quantities of food and shorter intervals of feeding than the stage of development met with at birth. Its functions are essentially weak, are not ready to be used, and if used, as they must be to support life, they are easily overtaxed, as I have proved over and over again. If we but recognize that while the fat digestion with its percentage of 3 to 4, the sugar digestion 6 to 7, the proteid digestion 1 to 1.50, are so well developed in the average infant at term, and so well provided for by human breast-milk with its percentages corresponding to what the digestive functions of this stage of development are ready to receive, we must realize, on the contrary, that the premature infant's digestive functions are in an earlier stage of development, and that at the seventh month of intra-uterine life the fat percentage, instead of being 3, as at the ninth month, may only be 1, the sugar digestion, instead of 7, may be only 3 or 4, and the proteid digestion, instead of 1 or 2, may be only 0.25 or 0.45.

These rules I have tested clinically, and they are

significant as showing that nature, while providing the best food by means of the human breast for the stage of development met with at term, does not provide a suitable food for the stage of development met with in the seventh and eighth month of pregnancy. Also, that many a premature infant has died from being put to the breast of its own mother, for the human mamma has not been made to modify its milk constituents into low percentages, but from long ages of use and inheritance has been taught to modify in the higher percentages adapted to the tenth, eleventh, and twelfth, or rather first, second, and third months of life. In this class of cases, therefore, there seems to be no question that the careful modification of cow's milk by dealing with low percentages gives the premature infant a far better chance for life than does human breast-milk. Any one who has followed a premature infant from the day of birth, giving it up to the time of weaning nothing but carefully combined percentage feeding, seeing it digest and thrive first on 0.50 of fat, 4 of sugar, 0.25 of proteids; then on 1 of fat, 5 of sugar, 0.50 of proteids; then 1.50 of fat, 5.50 or 6 of sugar, and 0.75 of proteids; then on 3 of fat, 6.50 of sugar, 1 of proteids; then on 3.50 of fat, 6.50 of sugar, 1.50 of proteids; then on 4 of fat, 7 of sugar, and 2 of proteids in the sixth month, cannot help feeling that, at least, we are approaching the time when an exact system of dealing with nutrition is to be hoped for.

With equal satisfaction can we look upon the value of milk modification for purposes of weaning. Taking up the last percentages which I have just mentioned, fat 4, sugar 7, proteids 2, we now wish to replace at perhaps the tenth, eleventh, or twelfth month, in some cases later, this modified milk by unmodified cow's milk with its percentage of fat 4, sugar 4.50, and proteids 4. In no way can this be done so well and so satisfactorily as by slowly changing the percentages until they have approached each other so closely that the digestive functions of the infant cannot help being ready to receive unmodified cow's milk.

During the past three summers a large number of poor infants suffering from diarrheal diseases have been fed from the Boston Milk Laboratory on modified milk. Last summer having complete control of the fund which, chiefly through the generosity of Mr. N. S. Bartlett, has been donated for this purpose, I was enabled to have the administration of the milk kept under somewhat strict supervision. To accomplish this I only allowed it to be dispensed from three of the clinics where responsible physicians were in attendance. I also had a physician who thoroughly understood his work supervise all the cases which

were treated. The results were most satisfactory, and in fact the universal opinion of all the many physicians in Boston who have watched and endorsed the principle of modification in the treatment of the summer diarrheas of infancy, is that it is unquestionably beneficial. Of the 115 gastro-enteric cases which were carefully analyzed while being treated with modified milk, 5 died, in 1 there was no improvement, and 109 recovered. Of those who recovered 23 did not have their modification changed but did well. Eighty-six had a number of changes made in their modifications and did well. The average age of the patients treated was 6.42 months. The milk in all cases was heated to 167° F. The average number of feedings was 7.5. The average amount at each feeding was 4.5 ounces. The average alkalinity was 6.3 per cent. The average percentages given were: fat, 2.6; sugar, 5.8, and proteids, 1.2.

What I hope in the future to accomplish is to have the diarrheal cases so differentiated that they will be fed and treated by a reduction of the especial constituent of the milk which appears to offer a culture ground for the development of especial flora in the intestines.

In conclusion I would impress upon you how important I have found it to be to always carry out strictly all the many details which are necessary if we wish to obtain satisfactory results in the feeding of cases of difficult digestion.

**SERUM DIAGNOSIS OF TYPHOID FEVER,  
WITH REPORTS OF FIFTY-SEVEN CASES  
TESTED FOR THE REACTION BY EX-  
AMINING SPECIMENS OF  
DRIED BLOOD.<sup>1</sup>**

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ABOUT two months ago, very soon after the appearance of an article by Dr. Wyatt Johnston of Montreal on the application of the serum diagnosis of typhoid fever to the requirements of public health laboratories, I began a practical test of his method at the suggestion of Dr. E. H. Wilson, chief of the Bacteriological Bureau of our own Health Department. The purpose of this paper is to make known the results of these investigations and weigh their practical and clinical significance.

The phenomenon which is commonly spoken of as the "Widal reaction" may be briefly described at the outset as follows: Add a certain proportion of blood serum from a patient suffering from well

developed typhoid fever to a bouillon culture or watery emulsion of the typhoid bacillus, and in from thirty minutes to several hours flocculi or clumps will have formed throughout the mixture and fallen to the bottom as a granular sediment, leaving the overlying fluid more or less clear. A control culture of the typhoid bacillus treated in the same way with the blood of a non-typhoid, sick or well, will remain uniformly cloudy, with no sediment. If a drop of the former mixture be transferred to a cover-glass and examined microscopically the bacilli will be seen to gather into masses and become motionless, while the few that remain free gradually lose their motility. A drop of the latter mixture will be seen to contain very actively motile bacilli evenly distributed throughout the fluid, and this condition will be found to persist for hours, and even days, if the specimen be properly sealed to prevent evaporation. To the agent which causes this agglutination, and which seems to be identical neither with the bactericidal or the immunizing substances of the immune sera, Pfeiffer has given the name "paralysin," and Gruber "agglutinin."

Knowledge of changes in the form of bacteria due to the action of sera of immunized animals rests on R. Pfeiffer's original experiments on specific cholera immunity. The so-called "Pfeiffer reaction" may be described as follows: Inject a mixture of an emulsion of the vibrios (cholera, etc.) which are to be tested, with a minute quantity of the serum of a very highly immunized animal into the peritoneal cavity of a normal guinea-pig. If the reaction is positive, all the vibrios are converted into spherules or coccus-like bodies in an hour or less. According to Pfeiffer, the vibrio is then to be regarded as belonging to the same species as that by means of which the immunization of the animal was carried on. If, on the contrary, the reaction is negative, the vibrios are unaffected after remaining an hour or more in the guinea-pig's peritoneal cavity, and are then considered to be of a different species from those used for immunization. In this same connection Pfeiffer demonstrated that the blood serum of animals immunized against cholera protects other animals against otherwise fatal doses of the cholera culture. He also noted the agglutination of the vibrios when combined with the serum, as described above, and he showed that the serum may cause this clumping outside of the animal's body if first injected for awhile into the peritoneal cavity of a sound animal. He demonstrated the same fact with typhoid serum and cultures.

Issaeff and Ivanoff, working with the *vibrio* *Ivanoff*, have the credit of having first demonstrated the reaction in gross and without the direct or indirect

<sup>1</sup> Read at the meeting of the King's County Medical Association, January 13, 1897.



aid of the living body. This vibrio grew abundantly in the serum of a normal guinea-pig with clouding of the mixture. In the serum of an immunized guinea-pig flocculi formed, and in a few hours fell to the bottom of the glass as a sediment, leaving the supernatant fluid clear.

Gruber and Durham<sup>1</sup> were the first to thoroughly describe the reaction and weigh its practical and theoretical value. They emphasized the reaction outside of the body of an animal (*in vitro*) and proposed its use instead of Pfeiffer's reaction to identify cholera and typhoid bacilli. Furthermore, Pfeiffer's reaction is regarded by them to be of a dual nature:

(1) The weakening of the microbes before injection by direct action of the active serum. (2) The nor-

mal immunized with the same race that was being tested. They further prognosticated that the process occurs with all kinds of motile bacteria, and stated their belief in the probability that non-motile bacteria also will be found to react in a similar manner under the influence of their appropriate sera. In support of this, they mention typical reactions with colon bacilli, a majority of the individuals being devoid of the power of movement before the addition of the serum, and many of them unprovided with flagella; also, observations of "granular agglomerations" in hog-cholera bacilli (Metschnikoff), and in pneumococci (Washbourn), when grown in their own serum. They demonstrated that various chemical solutions, heat, foreign sera, tuberculin, etc., though

TABLE NO. 1.

Number.	Disease.	Reaction.	No Reaction.	Period of Fever.	Remarks.
1.....	Typhoid.	..	I	9th day.	
2.....	"	I	..	10th day.	Clinical diagnosis doubtful at time of test.
3.....	"	I	..	21st day.	
4.....	"	I	..	14th day.	Clinical diagnosis doubtful at time of test.
5.....	"	I	..	10th day.	
6.....	"	I	..	35th day.	
7.....	"	I	..	21st day.	
8.....	"	I	..	21st day.	
9.....	"	I	..	Convalescent - 14 days.	
10.....	"	I	..	35 days.	
11.....	"	I	..	8th day.	Clinical diagnosis doubtful at time of test.
12.....	"	I	..	7th day.	Clinical diagnosis doubtful at time of test.
13.....	"	I	..	35th day.	
14.....	"	I	..	17th day.	
15.....	"	I	..	9th day.	
16.....	"	I	..	26th day.	Fever and headache the only symptoms of typhoid.
17.....	"	I	..	7th day.	
18.....	"	I	..	10th day.	Clinical diagnosis at first doubtful. Child of five years.
19.....	"	I	..	14th day.	
20.....	"	I	..	21st day.	
21.....	"	I	..	18th day.	
22.....	"	I	..	12th day.	
23.....	"	I	..	14th day.	
24.....	"	..	I	7th day.	Died of perforation eighth day. Sister of No. 23.
25.....	"	I	..	10th day.	Marked typhoid symptoms, clearing suddenly about tenth day.
26.....	"	..	I	6th day.	Test on third day also negative.
27.....	"	..	I	7th day.	Developed undoubted typhoid.
28.....	"	I	..	Several weeks.	

mal bactericidal influence of the guinea-pig's peritoneal fluid upon these weakened microbes. Very weak cultures treated with normal serum, and virulent cultures weakened by heat react in the same way on injection. They conclude, in this connection, that the reaction *in vitro* forms the essential part of Pfeiffer's reaction in so far as any specialized action is concerned, and that the use of the peritoneal fluid of a living animal obscures many of the points of difference which can be observed in the action of different sera. They demonstrated the phenomenon with cholera and many other vibrios, with several races of typhoid and colon bacilli, and also with the bacillus pyocyaneus, each being treated with its own or like serum—that is, a serum taken from an ani-

they may influence the motility of the germs under observation, do not cause agglutination. In their experiments with typhoid serum, two kinds were used, with nineteen varieties of typhoid bacilli. All reacted strongly though with varying rapidity. When this serum was combined with emulsions of the colon bacillus, no reactions occurred, nor did any of the nineteen races of typhoid bacilli react to colon serum. In the colon experiments they employed one colon serum and ten cultures of colon bacilli from different sources, among them several from a case of fatal peritonitis. These different races of colon bacilli did not all react with colon serum, but it is noteworthy that not one of them exhibited the slightest reaction to typhoid serum.

From the foregoing it appears that several investi-

<sup>1</sup> *Journal of Path. and Bact.*, vol. iv, No. 1.



gators had observed and demonstrated the reaction of motile bacteria with their own sera, and in typhoid fever and cholera the serum of convalescents had been found to work equally well with that of artificially immunized animals. The value of the phenomenon as a method of identifying doubtful races of germs, and, *vice versa*, of diagnosing the disease, had been discussed; but it remained for Widal to make the phenomenon of practical diagnostic value by demonstrating that the serum of typhoid patients possesses this peculiar agglutinating quality as early as the fifth day of the disease, and very generally by the eighth or ninth day. He believes the clumping to be an infection, and not an immunity, reaction. Widal describes two methods of diagnosis which he recommends to be carried out concurrently. A brief description of the methods is in order, inasmuch as they are practically those adopted by all present investigators on the same line.

*First Method.*—Draw a few drops of blood from the end of the finger. Mix the separated serum with ten parts of a one-to-two day typhoid bouillon culture. Observe with the microscope from one-half to several hours. If large clumps of motionless bacilli gather and the areas between are free or almost free from bacilli, the case is typhoid.

*Second Method.*—Draw about 5 c.cm. of blood from the median vein of the arm with a sterile syringe. Mix  $\frac{1}{2}$  c.cm. of serum with 4 c.cm. of typhoid bouillon culture. Incubate at 37° C. for twenty-four hours, when the reaction will be complete. (Breuer<sup>1</sup> notes that if the active serum is added to a twenty-four-hour typhoid bouillon culture the reaction will be plain in eight to twelve hours but less so at the end of twenty-four hours. If the bouillon is inoculated with typhoid bacilli at the same time the serum is added, it requires about twenty-four hours for the reaction to reach completion). To Widal must also be given the credit of having first stated that dried serum and, to a lesser extent, dried blood are capable of furnishing the reaction. His results and those of his followers in France have been so uniformly successful that they have inspired widespread confidence in the infallibility of the method. R. Stern,<sup>2</sup> in a review of Widal's report, says that the latter found the reaction present as early as the fourth or fifth day. He missed it once on the sixth but found it on the seventh day. All non-typhoids gave negative results. The reaction was most intense after the drop in the fever, but there was no proof of relation between the strength of the reaction and the severity of the disease.

Dr. Johnston,<sup>3</sup> independently of Widal, deduced

from the fact that substances, such as the toxins and antitoxins (analogous to the agglutinins) preserve their characteristics in a dry state, that the same might be true of the substances causing the serum reaction. He therefore examined specimens of dried blood from ten typical cases of typhoid and found the reaction to be complete in every instance. As control cases he examined the dried blood from a number of healthy persons, and from ten hospital patients suffering with other diseases than typhoid. In none of these did he get a reaction, except an "occasional pseudo-reaction" which he described as a partial agglutination and loss of mobility which was regained in an hour or two. Two doubtful cases failed to give the reaction, and subsequent developments proved that they were not typhoid. He concludes that this method is "just as efficacious as the pure serum method for the diagnostic purposes of the test," and recommends its use in public health bureaus to the end that typhoid cases may be earlier and more generally reported.

Such, then, is the history in brief of the development of the Widal method of serum diagnosis. I have yet to find a report of an experimenter who questions the specific nature of the reaction, provided the procedure recommended by Widal is carried out, and the reaction is tested both microscopically and in gross. Indeed, according to report it may be laid down almost as an axiom that if diluted sixteen times, the serum of typhoid is the only one giving a distinct agglutinative action with the typhoid bacillus. Unfortunately, the dried blood method brought forward by Johnston cannot claim the same degree of trustworthiness, nor can the microscopic examination of any emulsion in which the serum is used in low dilution. It is doubly unfortunate because the method is so simple that it could be rapidly introduced into general use. On the other hand, few physicians would care to subject their patients to a venesection, and even the simple capillary glass tube would be less used.

Before passing to the consideration of my own cases I wish to mention a few reported quite recently by other investigators. R. Stern mentions a case of otitis which, with the serum dilution of one-to-twenty, gave a typical reaction with typhoid bacilli in less than one hour. The patient had never had typhoid. R. Breuer, who is enthusiastic in his recommendations of the gross method, reports poor results with the microscopic method of procedure. He says his results with the latter were not clear or satisfactory—not to be compared with the former. "Reaction seldom occurred before 15 to 30 minutes and in that time, usually, the sera of other fever patients caused distinct agglomerations." He

<sup>1</sup> *Berliner Klin. Woch.*, Nos. 47 and 48, 1896.

<sup>2</sup> *Centralblatt f. innere Med.*, No. 49, 1896.

<sup>3</sup> *N. Y. Med. Journal*, October 31, 1896.

says, further: "In my hands this variety of the method (microscopic) impressed me as untrustworthy." He reserves his judgment, however, in view of the preference for and confidence in that method in France among the disciples of Widal, but calls attention to the fact that the latter recommends the use of the microscopic method together with the gross method as a control. He reports no individ-

pitals and private practitioners of Brooklyn with the special end in view of testing the reliability of the dried-blood method, contains a few that also militate seriously against the usefulness of that procedure. The blood was in most cases dried on glass slides or pieces of paper before being sent to the laboratory. The usual precautions were observed, such as examining controls to see if the bacilli were not already

TABLE NO. 2.

Number.	Cases.	Reaction.	No Reaction.	Remarks.
1.....	Phthisis .....	I	..	Cough, high fever, emaciation. No history of typhoid previously. Fresh specimen of blood one month later reacted at once.
2.....	Rheumatism .....	I	..	Reaction in five minutes. Repeated with fresh blood three weeks later.
3.....	Malaria .....	I	..	Fever the only symptom suggesting typhoid.
4.....	Tuberculosis .....	..	I	
5.....	Pneumonia .....	..	I	
6.....	Tuberculosis .....	..	I	
7.....	Syphilis .....	..	I	Secondary.
8.....	Tuberculosis .....	..	I	
9.....	Syphilis .....	..	I	Secondary.
10.....	Mumps .....	..	I	Convalescent.
11.....	Rheumatism .....	..	I	
12.....	Pneumonia .....	..	I	Third week.
13.....	Pleurisy .....	..	I	
14.....	Cerebral abscess..	..	I	
15.....	Puerperal fever...	..	I	
16.....	Doubtful .....	..	I	Temperature 99°-104° F. Two small hemorrhages from bowels. Temperature normal and rapid improvement after removal of ovarian cyst. No reaction one month later.
17.....	Malaria .....	..	I	Tertian form.
18.....	Scarlatina .....	..	I	
19.....	Pleurisy .....	..	I	Suspected typhoid at first.
20.....	Endocarditis .....	..	I	
21.....	Old typhoid .....	I	..	Had typhoid three years ago. Reaction in one hour.
22.....	" .....	I	..	" " six " " " " " "
23.....	Typhoid .....	..	I	" " ten " " " " " "
24.....	Old typhoid .....	..	I	" " six " " " " " "
25.....	" .....	..	I	" " four " " " " " "
26.....	" .....	..	I	" " sixteen " " " " " "
27.....	Normal serum .....	..	I	Guinea-pig's blood.
28.....	" .....	..	I	Human blood.
29.....	Antitoxin .....	..	I	Serum of horse, 100 units.

ual cases tested microscopically, having confined experiments almost exclusively to the gross reaction.

Most unfavorable of all is the report of A. S. Gruenbaum<sup>1</sup> giving results of his tests conducted in Vienna. He used the microscopic method without regard to the ratio of dilution of the serum. As appears in the appended table, eight typhoid patients, and five who had had typhoid from five to thirty-seven years previously, gave the reaction, but so did also fifteen out of twenty-four patients suffering from miscellaneous diseases other than typhoid. It is a curious fact that all the jaundice cases tested gave a strong reaction with typhoid bacilli. Favorable to the dried blood method are the reports of Johnston—ten typhoids with uniform reaction, and ten non-typhoids with no reaction; and C. L. Greene,<sup>2</sup> twenty-seven typhoids with uniform reaction, and thirty-three non-typhoids with no reaction.

My own series of cases, collected from several hos-

clumped, preserving a nearly uniform temperature for the reaction, and examining the lower part of the drop under inspection, for clumps. A drop of distilled water was added to and mixed with a drop of dried blood. This was transferred to a cover-glass and a drop of an emulsion of typhoid bacilli in filtered water added to it. The glass was then sealed with vaseline over a hollowed glass slide and observed at intervals during one or two hours, and again at the end of twenty-four hours. In the great majority of instances the reaction occurred, if at all, in from one to thirty minutes. Two races of typhoid bacilli were used in the tests, one of the same race as those used by Professor Pfeiffer in his original experiments, and the other recovered by Dr. Wilson from the spleen of a fatal case of typhoid. The latter was subjected to all the important differential tests and its identity established beyond a doubt.

Case No. 3 of Table No. 2, a hospital patient, disease diagnosed as malaria and having no other symp-

<sup>1</sup>Lancet, September 30, 1896.

<sup>2</sup>N. Y. Med. Record, November 14 and December 5, 1896.

toms of typhoid than remittent fever of two weeks duration, gave a clear reaction.

Case No. 2 of Table No. 2, of acute rheumatism, at St. John's hospital, gave the reaction in five minutes with both typhoid cultures. The test was repeated with a fresh specimen of blood three weeks later with the same result.

Case No. 1 of Table No. 2, of advanced tuberculosis, at the U. S. Naval Hospital, gave a doubtful reaction. One month later the reaction was marked and immediate. The patient could remember no sickness of recent years lasting longer than one week. Of the other twenty-six cases of non-typhoid contained in Table No. 2, all but two gave no reaction,

the results reported by Durham. A reaction took place in all of the 22 tests, more marked and rapidly developed in the typhoid sera, but distinct with the others. In all cases the reaction persisted during the time of observation, from one hour to twenty-four hours. The behavior of this race of the colon bacillus is most interesting and suggests a wide range of susceptibility in different races of the same species of bacteria. None of the 10 races of the colon bacillus used by Durham in his experiments reacted in the least to his typhoid serum. The same variation of susceptibility in typhoid cultures will be noted later.

Adding to my own the cases reported recently

TABLE NO. 3.

Disease.	Number Reported.	Reaction.	Day of Fever.	Dilution.	Method.	Reported by:
Typhoid..	10	10	.....	Indefinite.....	Dried blood. Micro- and macroscopical ..	W. Johnston.
" ..	1	1	9th	" ..	" ..	R. Stern.
" ..	1	1	16th	" ..	" ..	" ..
" ..	13	13	14th-21st	" ..	" ..	" ..
" ..	1	1	14th-21st	" ..	" ..	" ..
" ..	8	8	.....	Indefinite.....	Microscopical ..	Gruenbaum.
" ..	1	1	6th	.5-4 c.cm.	Macroscopical.....	R. Breuer.
" ..	3	3	8th	" ..	" ..	" ..
" ..	2	2	9th	" ..	" ..	" ..
" ..	4	4	10th	" ..	" ..	" ..
" ..	4	4	12th	" ..	" ..	" ..
" ..	6	6	14th	" ..	" ..	" ..
" ..	5	5	16th	" ..	" ..	" ..
" ..	6	6	21st	" ..	" ..	" ..
" ..	2	2	23d	" ..	" ..	" ..
" ..	3	3	28th	" ..	" ..	" ..
" ..	2	2	30th	" ..	" ..	" ..
" ..	1	1	40th	" ..	" ..	" ..
" ..	4	4	1-2 weeks, convalescent.	" ..	" ..	" ..
" ..	1	1	4th	Indefinite.....	Dried blood.....	C. L. Greene.
" ..	1	1	7th	" ..	" ..	" ..
" ..	1	1	10th	" ..	" ..	" ..
" ..	24	24	14th-65th	" ..	" ..	" ..

and these had had typhoid three and six years before, respectively. Four other cases having had typhoid four, six, ten, and sixteen years previously, failed to give the reaction.

The cases diagnosed clinically as typhoid, or later developing typhoid symptoms, I have collected in Table No. 1. There are 28 of these, and 4 failed to give the reaction. One of the latter was examined on the sixth day of the fever, 2 on the seventh, and 1 on the ninth. The remaining 24 cases gave the typhoid reaction, and of these 2 were examined on the seventh day, 1 on the eighth, 1 on the ninth, 4 on the tenth, and the rest from the twelfth day to the second week of convalescence. In most of the cases typhoid had been already diagnosed at the time of the test, but in 5 the diagnosis was doubtful, and the test added a little weight to the proper arm of the balance.

The sera of 11 typhoids and 11 non-typhoids was tested with a culture of the colon bacillus, and the results were rather surprising in view of

by Johnston, Stern, Gruenbaum, Breuer, and Greene, and collected by me in Tables Nos. 3 and 4, we have a number sufficiently large to make a fair basis for criticism and deduction. As is noted in the tables, the tests were made by some in gross and others microscopically; some with dried blood and others with serum. In all, 132 typhoids were tested, of which 1 gave a doubtful reaction, and 4, examined on the sixth, seventh, and ninth days, no reaction. One hundred and twenty-nine non-typhoids were tested, and of these 26 gave a reaction (7 having had typhoid from three to thirty-seven years previously), 5 a doubtful reaction, and 98 no reaction.

What conclusions are we justified in drawing from these figures? Considering my own results, and the more striking results of Breuer and Gruenbaum, I feel convinced that the method recommended by Johnston of testing dried blood in low and indefinite dilution contains too many sources of error to warrant its use as a method of diagnosis. Many vari-



eties of serum in low dilution have been found to cause a reaction with typhoid, colon, and cholera germs. If in a given case the test be negative we can only report that it is either too early in the course of the disease to enable us to obtain a reaction, or that it is not typhoid; if the test be positive, that it is probably typhoid but may be something else. Fortunately, we have the promise of a more accurate and conclusive method, which I expect to use in a later series of experiments in this connection. Widal recommends a dilution of the serum 1-10 to 1-15, and Gruenbaum makes the statement that if diluted sixteen times the serum of typhoid is the only one giving a distinct agglutinative action with the typhoid bacillus. Widal states that at the height of typhoid the serum is active at a dilution of 1-60 to 1-80, and Stern states that in seven of his typhoid cases the serum was active at 1-100 to 1-2000. The serum of non-typhoids is said to lose the power of reaction very rapidly after three or four dilutions.

of dried blood, we may hope for less variable reports from those experimenting upon this line in the future.<sup>1</sup>

## DISCUSSION.

Dr. W. H. Park of New York said: I have listened with great interest to the paper by Dr. Thomas. Like him, I have been making daily examinations of specimens of blood from suspected cases of typhoid fever. As to the method of examination, I agree with the opinions expressed except that I require the reaction to occur within even less time than he does. To be of value in establishing a diagnosis of typhoid fever, I believe that the bacilli should show upon the mixture with the serum an immediate inhibition of movement and a marked tendency to clumping. With dried blood solutions I believe that the reaction which occurs after fifteen minutes is often misleading. As Widal's serum test is quantitative rather than qualitative, we must use not more than one part of serum to nine of culture; otherwise, we will get reactions from non-typhoid cases. For practical

TABLE NO. 4.

Cases.	Number Reported.	Reaction.	No Reaction.	Dilution.	Method and Remarks.	Reported by:
Miscellaneous..	10	..	10	Indefinite.....	Dried blood.....	W. Johnston.
Otitis .....	1	1	..	1-20.....	Microscopical and Macroscopical. Patient never had had typhoid.....	R. Stern.
Normal.....	5	5	..	Indefinite.....	Had had typhoid 5-37 years before.....	Gruenbaum.
Miscellaneous..	24	15	9	" .....	Cholera vibrios reacted with 16 out of 29 cases, and colon bacilli with 3 out of 3. All jaundice cases gave strong reaction with typhoid bacilli.	"
Miscellaneous..	27	..	22	.5-4 c.cm .....	Macroscopical. Five gave a pseudo reaction.....	R. Breuer.
Miscellaneous..	33	..	33	Indefinite.....	Dried blood.....	C. L. Greene.

These matters of dilution and of culture susceptibility I believe to be of the utmost importance in testing for reactions, and unless the working errors dependent on them be reduced to a minimum we shall not be very sure of our results. If Widal's culture reacts to no higher dilution than 1-80, while Stern's culture reacts as high as 1-2000, it requires no effort of the imagination to believe that susceptibility may vary as much in the other direction, and that another person experimenting with an insusceptible race of germs might obtain negative results where they should obtain positive results. Pfeiffer and Kolle found cholera germs very variable in susceptibility to a given serum.

It is therefore of the greatest importance that the stock culture with which one is to work should, as a preliminary, be tested with a serum of known potency; and, furthermore, it is indispensable that the ratio of serum to typhoid culture should be fixed at a point where the serum of non-typhoids is surely incapable of reaction. With attention to these details, which is obviously impossible when one examines a specimen

purposes, examinations made from dried blood are nearly as reliable as from serum. For experimental purposes, the fluid serum is far better, as allowing more accurate dilutions. It can be obtained from blood or blisters.

The results obtained by me, and by the other workers in the laboratories of the New York Health Department, have agreed with those of Dr. Thomas. A definite reaction has been present in about seventy-five per cent. of the cases upon the first examination. It usually appeared by the sixth or seventh day. Re-

<sup>1</sup>Since writing the above I have read a circular issued by Dr. Johnston under date of January 7, 1897, in which he reports modifications of his method that render it less open to criticism. He states that he has recently met with a number of normal cases in which the serum causes a decided agglutination. By using attenuated cultures of the germs he finds that the reaction takes place with typhoid serum only. He also advises dilution of the mixture of dried blood and typhoid emulsion till it retains only a faint tint of the red. These modifications make the process more reliable, in my opinion, and the attenuation of the bacilli acts in a manner similar to the definite dilution of the serum which I have emphasized. I believe, however, that the latter procedure is the more accurate. By drawing a few drops of blood from the patient's finger in capillary glass tubes, separating the serum and mixing it with a definite amount of filtered water in a graduated capillary tube (Gruenbaum) a maximum degree of accuracy is attained and the procedure remains simple enough for general use as a diagnostic test.

garding the duration of the reaction, I first feared that it would persist so long in the patient that it would interfere greatly with the value of the test in making a positive diagnosis. My experience has been, however, similar to that of Dr. Thomas. In very few does the reaction exist for over a year to such a degree as to interfere with the value of Widal's test for the present illness. As to whether the reaction occurs in other cases than typhoid, and if so, how often, we will have to wait for many more examinations. Dr. Thomas's case of phthisis, in which the reaction developed during the disease, would indicate that in exceptional instances the reaction may develop in non-typhoid cases.

I have myself met with three colored persons whose blood gave a decided reaction. These three all had continuous fever for from eight to ten days, but no other symptoms of typhoid fever. In none of them was the cause of the fever discovered, and they may have had irregular typhoid fever. It is possible that even in the case of phthisis reported by Dr. Thomas intestinal ulcerations may have been present, and possibly a slight typhoid infection have occurred. A definite typhoid reaction with blood or serum, one part to ten or more of culture, certainly rarely occurs, except with that from typhoid patients or convalescents. It seems to me that the results so far obtained warrant us in attributing great diagnostic value to a positive typhoid reaction. The absence of the reaction in a single test has little value. It does not exclude typhoid fever. Repeated negative results in a single case, or negative results in a number of similar cases, would have very great value, however, in excluding typhoid fever.

#### THE EXTRACTION OF TOO LONG RETAINED SILK AND SILKWORM GUT LIGATURES AND SUTURES.

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ALTHOUGH it is widely recognized at the present day that silk and silkworm gut may provoke or keep up suppuration and a sinus, yet the security attained from the use of these materials is so much beyond that afforded by catgut, however treated, or by kangaroo tendon, that many surgeons still employ them, particularly in regions where the breaking of a ligature or its too early relaxation might embarrass the operation, or, more rarely, endanger the patient. Many operators, for instance, prefer in ovariectomy, in vaginal hysterectomy, in castration, in nephrectomy, and similar operations, to rely upon a silk ligature rather than on catgut, particularly since the larger catgut required is so often difficult to render free

from germs. It is only of recent years (and indeed, not always now) that the appendical stump is tied off by catgut, which is sufficient, rather than by silk, since this tube is easily compressed, and its temporary closure by the ligature is perfected in a few hours by rapidly forming peritoneal adhesions. When silk was used, not infrequently the sinus that persisted was found to be due to the retention of the ligature about the appendix, and I confess after I had abandoned silk for catgut in this operation, that some of Jack Horner's spirit often arose within me as I fished out, with the homely contrivance which is represented in Fig. 1, the offending loop left in by another operator.

The vagaries of the ovarian silk ligatures are many,

FIG. 1.



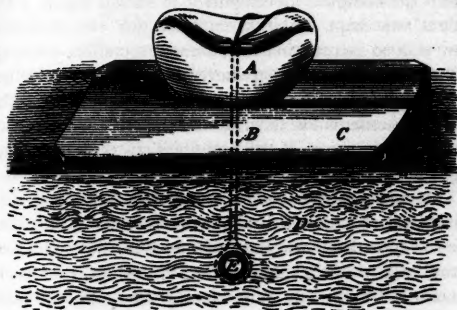
Crochet-needle of Bone or Steel.

and so well known as to merit only an allusion to them. Silkworm gut is almost germ proof, and lasts indefinitely. I have extracted unchanged, a suture of this material seventeen months after its introduction into a wound. As a rule, it is well borne when used as a buried suture, but when its track is invaded by a germ infection, it acts as a foreign body. For special care in closing up the freshly cut deep abdominal fascia, in my judgment, the closely applied one-fourth-inch apart fine silkworm gut suture is not equalled by any other, not even by the kangaroo tendon suture. Though per contra, in the ordinary hernia operations where the tissues are loose and are often torn rather than cut, and where, hence, possibilities of a suitable germ soil exist, the kangaroo tendon works better. To this, however, I make the exception in the cases of recurrent hernias, or those with large openings, where I prefer yet to rely on the persistent silkworm gut suture, rather than the kangaroo tendon, which does not last as long as is generally supposed, a number of trials in my hands having shown that it rarely endures beyond fifteen or twenty days.

Returning to the gist of these remarks, I ask attention, in the extraction of a sinus-producing buried suture, whether of silk, silkworm gut, or even of wire, to the use of the ordinary crochet-needle, made either of bone or steel, which can be bought almost everywhere, and at a cost of a few cents. The hook end, if too sharp, can be dulled with the edge of a file. For special cases I have had some steel ones made larger than could be bought, and also some that could be bent to accommodate the curves of a sinuous track. But with the use of this common implement a suture can often be caught, dragged to the surface, and

seized by forceps, when it may be cut and extracted. Its need and its use is so self-evident that I fear that I am only telling a twice-told tale. In the cases where, in full cognizance of the evils of a silk ligature, I nevertheless have employed it, for instance, as the most important, in lumbar nephrectomy for pyonephrosis, I have usually left one or both ends of the ligature hanging out of the wound. The coming away of these ligatures may require from three weeks to three months, even though digital traction may be made

FIG. 2.

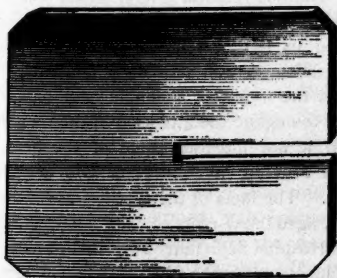


Rubber-ball Traction on Rebellious Ligature.

A, rubber ball indented by the traction of the ligature. B, ligature. C, slotted splint. D, skin and underlying tissue. E, blood-vessel.

from time to time. In one case just completed, the ligature still held at the end of the tenth week. In another operation two months since, the ligature remained *in situ* four weeks after the operation. I had in cases before these used the crochet-needle, but in the first of these last two nephrectomies I learned of a risk that does not usually exist in other localities. The needle in its introduction must have passed beyond the ligature, for in its withdrawal it caught in one of the renal veins and tore it, when a fierce

FIG. 3.

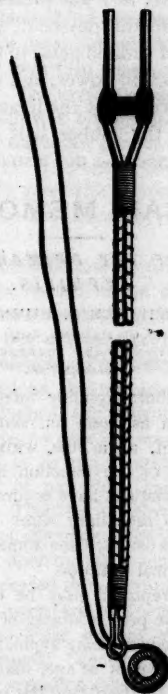


Slotted Splint.

hemorrhage occurred which momentarily alarmed me, though it was soon checked by firm pressure. I was therefore unwilling to try this plan again in that case, and began traction on the ligature by a rubber band to which was attached a two to four-ounce lead

sinker. This, by gravity, the patient being up and about, cut the edges of the cicatrix, and its use was abandoned. Then the contrivance shown in Fig. 3 was employed, with excellent success. The ligature end was passed through a small rubber ball (costing 5 cents) and fastened, after squeezing the walls of the ball together, on its outer side. The thus flattened ball exerted pressure directly outward, and the only mishap that occurred was due to the counter pressure the ball exerted on the covered cicatrix. This was obviated by passing a piece of thin basswood splinting, duly padded, between the wound and the ball. After

FIG. 4.



Cleveland's Cautery Wire Adjusted for Severing the Ligature.

five-days' use of the traction, which was not particularly painful, the ligature came away. In the second nephrectomy, where the rubber-ball traction was similarly applied, the ligature came away in a week's time. In a third and fourth nephrectomy performed since then, I resorted, however, to a method which is even better than the foregoing one, but which requires more ample resources. The suggestion of it is due to Dr. Clement Cleveland, who showed at the meeting of the Practitioners' Society in May, 1896, some wire loop electrodes similar to those used for laryngeal cauterization. These he had used with success in freeing at will the silk ligatures employed in vaginal hysterectomy. At the operation the silk ligature is



passed through the base loop of the otherwise insulated electrode, and its ends pass out of the wound alongside the wires of the electrode. At the desired time, a galvanic cautery battery of weak power heats the little loop sufficiently to burn through and liberate the ligature. This plan was used by me in both of these nephrectomies with a most satisfactory issue, and left nothing to be desired. But in the absence of an electrode and a battery, I venture to commend the little expedient of the compressed rubber ball as simple, ready, efficient, and cheap. Mechanical hints of value often come from the patient himself or his friends. This was instanced in the second case of delayed ligation, as I was presented by the brother of the patient with the device of a spring tractor attached to a broad padded piece of wood with a spring of four-ounce traction power, and with a little ratchet capable of rendering taut the ligature emerging from the wound, but the rubber ball acted efficaciously and the contrivance was not tested.<sup>1</sup>

## CLINICAL MEMORANDA.

### EXCISION OF THE PRIMARY LESION OF SYPHILIS.

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THE effort to abort syphilitic infection by the excision of the initial lesion as soon as recognized has been frequently made, but, as a rule, without positive results. When the nature of the infection has been undoubted, secondary manifestations have occurred at the usual time. In cases where no secondary signs have made their appearance there has usually been some doubt cast upon the nature of the original infection.

The case here reported may be open to some doubt, although to me the preponderance of probability is in favor of the original infection being syphilitic.

A., about fifty years of age, married, is the father of perfectly healthy children, and has no history of previous syphilitic infection. About February 6, 1896, he had irregular sexual connection. The woman, he says, appeared to be healthy and presented (to him) no evidence of syphilis: she was not a prostitute. On February 21st, he presented himself for treatment of a sore which had appeared on his prepuce a few days before. The probable

time from the date of connection to the time of the appearance of the sore was twelve days.

The sore was located on the prepuce at the junction of skin and mucous membrane; it was about one-fourth of an inch in diameter, was sharply outlined, and had exact edges which were completely indurated. The surface of the ulcer was bright red and was almost free from secretion. The patient had no fever, and there was no lymphatic involvement.

The physical appearances were absolutely characteristic of the initial lesion of syphilis although the time of appearance was a little shorter than we usually expect to elapse before the complete development of such a lesion. The patient was kept under observation for two days, and there was no increase in the amount of secretion, or change in the other physical characteristics of the sore. It was then decided to remove it freely by circumcision. This was done under chloroform anesthesia, and there was complete primary union of the circumcision-wound, although slight infection of one stitch hole occurred.

The man has been under careful observation ever since, being seen at intervals of about one month. At this date, one full year from the time of infection, there is no evidence of any of the secondaries of syphilis, nor has his general health at any time during the year been below par, except from a temporary manifestation of spinal symptoms at the location of an ankylosed lumbar trouble, dating from childhood. His skin is clear and clean; the mucous membrane of the mouth has at no time shown any evidence of patches; his weight has increased. The specimen removed was submitted to Dr. H. C. Crouch for microscopic examination, and he reported that it was in all probability an initial lesion of syphilis.

### TRANSPERITONEAL LIGATION OF THE EXTERNAL ILIAC ARTERY FOR FEMORAL ANEURISM, WITH SUBSEQUENT DISSECTION OF THE SAC.<sup>1</sup>

BY N. P. DANDRIDGE, M.D.,  
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I WISH to report in the following paper a case of aneurism of the common femoral artery, which was treated by ligation of the external iliac artery, and the laying open of the sac and its partial removal by dissection after the ligation of the superficial and deep femorals. I should not consider the recital of a single case as of sufficient importance to engage the attention of the members of the Society did it not illustrate some of the questions now pressing for solution in connection with aneurism of the extremities. The facts of the case are as follows:

J. W. B., aged thirty-nine, colored, a laborer, entered the Cincinnati Hospital September 26, 1896: There was a history of rheumatism, and he admitted having had syphilis ten years ago. He has had gonorrhea twice, and is a moderate drinker. In May, 1896, he noticed a "lump" in the left groin, which throbbed and gradually attained the size of a hen's egg, and for three weeks he was obliged to abandon his work on account of the severe pain. His

<sup>1</sup> Since writing this paper I have seen described a method of using "traction" ligatures, which has been introduced by Dr. Grad of the Woman's Hospital, New York, which is superior to any device yet presented. He places under each tie of the knot a loop of silk, having thus for the ordinary knot two loops, and for a triple knot three loops, or tractors. One end of the ligature proper is cut short, and the other passes out of the wound. At the chosen time traction is made on the last applied tractor, and the last made turn of the knot unties. Tractor No. 2 is then pulled upon with a similar result, and finally tractor No. 3 disengages the first turn of the knot, when a light pull in turn on the ligature proper, disengages it, and its removal is allowed. A full account of this ingenious method is published, with explanatory figures, in the *American Gynecological and Obstetrical Journal* for February, 1897, with illustrative cases to which it had been applied.

<sup>1</sup> Read before the Southern Surgical and Gynecological Society, Nashville, November, 1896.

knee was drawn up and he could not walk. The tumor then became smaller, and he went back to work. Three weeks before entering the hospital, while carrying a hod up a ladder, he felt something give way in the left groin. He stopped work the same day and went to bed, there being severe pain in the leg. From the time of the "snap" the tumor constantly increased in size, the knee was drawn up and he was unable to straighten it. The pain became so severe that he decided to come to the hospital.

On admission, the knee was found drawn up at an angle of 45°, and the power of straightening it was lost. The severe pain was constant. In the left groin there was found a smooth, elastic, circumscribed pulsating tumor, 5 inches in the long diameter, and 3½ inches in the short diameter. The pulsation was expansile, and a well-marked thrill could be felt over the inner aspect. The tumor occupied Scarpa's triangle, reached fully up to Poupart's ligament, and outward as far as the spine of the ilium, and with the stethoscope a distinct bruit could be heard over its entire area. No pulsation could be found in the anterior or posterior tibial arteries at the ankle. It was evident from the condition present, and the history given, that we had to deal with an aneurism of the common iliac artery dating back probably to the accident in May, some six months, and which had become diffused at the time of the second attack, three weeks before the patient entered the hospital. The man was kept quiet in bed, on low diet, and iodid of potash was given. The swelling, with the transmitted pulsation, continued to increase steadily upon the outer and upper aspect, until it reached above and beyond the anterior superior spinous process of the ilium, and the pain continued to be severe. It was thus apparent that immediate operative interference was required. It was equally evident that ligation of the external iliac would be necessary to control the current of blood into the sac, as the aneurism involved the end of this artery as well as the common femoral. It was further apparent that the ordinary extraperitoneal operation, by an incision above and parallel to Poupart's ligament, was out of the question, as the pulsating swelling had already reached above and beyond the anterior spinous process and had invaded the iliac fossa. It was decided, therefore, to apply the ligature from within the abdominal cavity.

Seven days after admission, on October 5th, under ether anesthesia, a median incision about four inches in length was made, with the man in the Trendelenburg position. The external iliac artery was easily located by its pulsation, and an incision through the peritoneum, an inch or more in length, on its outer side readily exposed it. An aneurism needle armed with kangaroo tendon was passed from within outward and the vessel secured. Pulsation in the tumor at once stopped. The opening in the peritoneum over the iliac artery was closed by a fine silk suture, and the abdominal wound was then closed. An incision some six inches in length, reaching from above to a point below the swelling in the groin, was now made. When the sac was reached it was exposed by reflecting the overlying tissues with the handle of a scalpel. A free incision then laid open the aneurism, from top to bottom.

A large amount of fluid blood gushed out at once, leaving some laminated clots, and exposing to view the fibers of the pectineus muscle, showing that the sac had given way. The cavity thus made by the escaping blood reached well into the iliac fossa. Free hemorrhage at once occurred from below, from the openings of the superficial and deep femorals, which were both within the area of aneurismal dilatation, and from a small vessel above. A probe passed from the opening in the sac-wall, located the superficial femoral in the matted tissues below and enabled us to pass a ligature around it, but in so doing the vein was wounded, and it became necessary to secure it by a ligature which included the artery as well as a considerable mass of tissue. The deep femoral artery was isolated and secured outside of the sac, and the bleeding points above were clamped by hemostatic forceps, which were left in place two days. As much as possible of the sac, about one-third, was then separated by blunt dissection and removed. The wound cavity was packed with iodoform gauze, which was brought out at the lower end of the incision, and the upper portion of the wound was then closed by suture. The entire limb was wrapped in cotton. There was a good deal of numbness complained of in the leg, and it became necessary to use the catheter for several days.

The abdominal wound healed by first intention. The wound over the tumor healed except at one point in the middle and at the lower level where the gauze-drain had been. On the fifth day a serous oozing occurred from the first of these openings. The discharge subsequently became purulent, and as the pus came from a pocket which could not be drained, the patient was again placed under ether and the cavity was laid open. The remnant of the sac was found to be in a sloughing condition, and there was a quantity of pus which had dissected out a cavity of large size. This was on November 5th, thirty-one days after the first operation. The cavity was drained by a counter opening upon the outer aspect of the thigh, a drainage tube being passed through to the front incision. The wound was left open and the whole cavity packed with strips of gauze. Four months after the operation the discharge had ceased. There remained, however, a complete paralysis of sensation over the anterior aspect of the thigh, and inability to extend the leg on the thigh. It is probable that some branches of the anterior spinal nerve were cut in laying open the sac.

In commenting on the course adopted in this case, the following facts should be made prominent. Ligation of the iliac artery was clearly necessary, as no form of pressure offered any chance of success. The invasion of the iliac fossa by the dissecting blood made it probable that the aneurism itself could not be opened by the usual extraperitoneal incision. It was therefore deemed necessary to secure the artery by opening the abdomen. The median incision was chosen, as it gave freer access to the artery, so that the ligature could be placed as high as was necessary, and because it would be further away from the opening in the aneurism which it was proposed to make than if we approached the artery by the lower part of the linea semilunaris, and which would therefore have been

more liable to infection if suppuration should occur in the sac. The propriety of opening the sac was shown by the free hemorrhage which occurred from the openings of the superficial and deep femoral arteries, both of which were involved in the aneurismal expansion of the common femoral. This bleeding was only controlled by ligation of both vessels. If not thus secured, they would certainly have continued to discharge blood into the aneurism in sufficient quantities to cause its continued expansion. This part of the operation would have been much facilitated had we thought of throwing an elastic tourniquet around the thigh below. All bleeding could have been controlled, the arteries isolated, and the sac entirely dissected out. That complete, instead of partial, removal was desirable, is indicated by the suppuration and sloughing of the part left behind, which most certainly started from the remnant in place. The wound in the vein was not followed by any bad results.

I would formulate the following as the proper steps in an operation for aneurism of the groin situated so high that the common femoral cannot be secured: (1) Ligation of the external iliac by the transperitoneal route, through a median incision, with immediate closure of the wound in the abdominal wall. (2) The application of an elastic tourniquet about the middle of the thigh. (3) Free opening of the sac from top to bottom, and the removal of all clots, and the subsequent ligation of all the large arteries found opening from it, and then careful, complete extirpation by dissection and curettage. This will, I believe, be found much easier than the attempt to dissect out the mass entire before opening the sac. After opening, the different vessels can be located outside the sac by passing a probe along their course through the openings. Such vessels are often difficult to isolate. The vein should be spared if possible, but if this cannot be done it should be cut between two ligatures. Important nerves will be more easily avoided.

Bolton, in his article on "Special Aneurisms," in Dennis' "Surgery," vol. ii, page 414, says that "extirpation of the sac has twice been undertaken" in aneurisms of the groin, once by Rose in "an aneurism which had recurred two years after ligation of the external iliac," and once by Bazy, "who extirpated a large aneurism with success after tying numerous large afferent arteries." The same author, quoting from Delbet's statistics, gives 67 cases of ligation of the external iliac artery for aneurism of the groin, with 42 cures and 25 failures. There were 13 deaths (2 being due to accidental causes) in these 25 cases, and in the remaining 12 there was no change in 5, in 5 suppuration ensued and a cure resulted, in 1 gangrene required amputation, and in 1 secondary hemorrhage required a second ligation, and ended in cure. In estimating the advantage of extirpation of the sac, reference may be made to these figures. Thus, in these 67 cases, the aneurisms remained unchanged in 5, in 1 secondary hemorrhage occurred in the sac, and in 5 suppuration occurred. Suppuration in the sac is one of the recognized dangers if the sac is left. Such a complication, of course, would not take place after extirpation. In 5 cases no changes occurred in the aneurism after simple ligation. Extirpa-

tion of the sac may compromise the veins, though not necessarily so, and there is sufficient experience now to show that this is not of much importance. Furthermore, recurrence of the aneurism may take place even years after simple ligation. Extirpation of course provides for this.

Hubler (*Beiträge zur klin. Chirurgie*, Tübingen, May 28, 1892) has collected 40 cases of complete extirpation of aneurism from different sources. Twenty-eight of these were arterial, and 12 arterio-venous. Twenty-nine were traumatic, and 11 non-traumatic; in 18, the lower limb was affected, and in 16 one of the upper. These cases were all successful except one. In none of these cases was there any mention made of gangrene or secondary hemorrhage. If the common femoral artery can be reached in aneurism of the groin, a ligature should be placed upon it, and then the extirpation proceeded with as above. In cases of aneurism of the superficial femoral artery digital compression gives such favorable results and is attended by so little danger that it should first be tried, and if not successful ligation and extirpation should be proceeded with. The intimate relation of popliteal aneurisms to the overlying nerve and vein, and the proximity of the joint make extirpation extremely dangerous, so that ligation at a distance should probably be tried (in case compression of the femoral fails in place of extirpation) unless the aneurism is of very large size.

## CLINICAL LECTURE.

### THE NATURE AND OPERATIVE TREATMENT OF HYDROCEPHALUS; DRAINAGE FROM THE LOWER END OF THE SPI- NAL CANAL; REPORT OF A CASE.

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I SHOW you an infant, three months of age, suffering from a typical case of hydrocephalus of distinct type, which is not so far advanced as to make it necessarily or certainly hopeless. This is the first child of healthy parents, the mother being much younger than the father. The mother's pregnancy and delivery were normal, and the child was a month old before she suspected that anything serious was the matter, and took him to a physician. She consulted Dr. Woodbury, who kindly referred the case to me. Even at that time there was a disproportion between the upper and lower portions of the head, and the eyes were somewhat prominent. After the indications of hydrocephalus were complete, the child had a little accession of temperature, and remained listlessly in its mother's arms. I suggested the use of potassium iodid, with the hypophosphites, as a tentative measure, while the parents were considering the advisability of an operation. In view of the progress of the disease, they have made up their minds to submit the babe to anything that affords the slightest hope of relief of the condition; and it is here to-day for operation.

<sup>1</sup> Clinical lecture delivered at the Buffalo General Hospital.



The therapeutic and medical aspects of the malady have been discussed elsewhere, and consequently I confine myself to considering its pathology and surgical treatment. First, we divide these cases into the *congenital* and *acquired* forms, with the statement, however, that as occurring in the very young a very large proportion of them belong to the congenital type, an explanation of the occurrence of the affection being afforded by some deviation from the normal arrangement of the brain and its cavities originating during the development of the fetus. We must distinguish also between the truly congenital and postpartum hydrocephalus. The acquired form may be observed alike in children and adults, and may be due to syphilis, tuberculosis, or rickets. Next we speak of hydrocephalus *internus* and *externus*, the former being much more common, and including those cases in which the ventricles are distended with fluid, for the most part the lateral ventricles, but occasionally the fourth and fifth. In the latter type the collection of fluid is mostly between the brain and the expanded skull. In a hundred cases of so-called hydrocephalus, about eighty per cent., if not more, will be of the congenital type and the internal variety. In many instances, when the development of the brain is notoriously defective, there will be corresponding defects in other parts of the body. The tendency of the disease is toward an early death, most of these children dying soon after delivery. None of the theories yet advanced, however, account for all the lesions noted in many cases, such as the widening of the occipital foramen and spinal canal, and certain defects in the central nervous system. In adult cases, separation of the cranial bones is not possible. This occurs for the most part in rachitic children in whom the skull expands by degrees until it is capable of holding a relatively enormous amount of fluid, even several hundred cubic centimeters.

Among the causes of hydrocephalus we will place, first, defects of development which permit distention to a degree varying with the nature of the defect. Next, we have to do with the accumulation of ventricular fluid as the result of meningitis, encephalitis, tuberculous disease, or atrophy of the brain. In the latter case it is essentially a *hydrops ex vacuo*. The extreme forms of hydrocephalus may be due to pachymeningitis internal, which may produce a subdural exudate, in which case the collection of fluid is diffuse; or to some local lesion by which we have an encapsulated collection of cerebrospinal fluid, which is afterward known as hygroma of the dura. Often in a case thus localized, when occurring in the young, we may have an expansion of the overlying portion of the skull.

In this particular instance we have undoubtedly to deal with a congenital or postpartum form of the condition which has assumed from the outset a chronic course, as it usually does, but which tends steadily to disaster, since the little patient is already showing the effects of brain pressure. Aside from the essential and objective features of this case, namely, the change in size and shape of the upper part of the head, there are other equally distinct features to which your attention must now be directed, and these are for the most part compression symptoms, the brain being actually compressed within the child's

skull by the amount of fluid already present. You must not forget that the evidences of brain pressure are invariably the same, no matter what the compressing causes may be. These are unconsciousness, paralysis, loss of special senses, etc. In this instance the child remains for the most part apathetic, pays no attention to its surroundings, to flashes of light, nor to bright colors, is not attracted by moving objects, nor seriously moved by anything save that which gives acute pain. This night of the senses is characteristic of all these causes. The especial sense last to be affected is that of hearing, largely because of the great protection afforded to the organs of audition.

Regard now, for a moment, the hydrostatics of the craniospinal canal. You know that when fluid is confined under pressure, this pressure is equal at all points. Now the ventricles, the subdural space, the subarachnoid space, and the spinal canal all connect through well-known anatomical paths. The greater part of this fluid is normally contained within the subarachnoid space, which ordinarily is scarcely recognizable over the convexity of the brain, but easily so at the base, forming there the so-called "water-bed" upon which the brain is regarded as resting. This space connects with the ventricles by the foramen of Magendie, as well as with the sheaths of the nerves, from the orbit to the lower part of the spine. Pressure upon these nerves must interfere more or less with their function, evidences of such pressure being particularly distinct when made along the optic nerves. It is through the meshes of the arachnoid that the subdural and the subarachnoid spaces communicate. Thus, you will say that closure of Magendie's foramen may lead to the internal form of hydrocephalus. The subarachnoid space extends down the spinal canal; therefore, if it be tapped at any point the fluid will be removed from the cranial cavity.

Now the whole surgical treatment of hydrocephalus, consisting in removal of the excess of fluid, or at least of some part of it, is an affair mainly of deciding how this may best be effected, and whether it shall be a single or an occasional tapping, or a continuous drainage. The former is less serious and easier done, but correspondingly less efficient. Drainage when once established can be made efficient *if septic infection can be prevented*; this, however, is an almost impossible task, especially in little children or in babes like this one, and for reasons which are so self-evident that I need not discuss them here, this being equally true of drainage either about the head, neck, or lower spine. We have essentially the following methods, then, from which to select: (1) Tapping or drainage of the lateral ventricles. (2) Tapping or drainage at the base of the skull. (3) Tapping or drainage in the lumbar or lumbosacral region.

Some time ago I illustrated in this clinic the method of draining the lateral ventricle, in an infant some months older than this one, with a much expanded head. I made a small trephine opening at a point about an inch behind the external meatus and a little more than that above the base line of the skull; here I inserted a small trocar in a direction toward the opposite parietal emi-

nence until it entered the lateral ventricle, which was drained by a very small rubber tube. In this instance I took strenuous pains toward asepsis and when the child died, as it did some two or three weeks later of marasmus, it was found both on ordinary examination and by culture experiment that there was an absolute freedom of the interior of the cranium from all septic infection. This method has been resorted to a number of times but has rarely if ever given anything like permanent satisfactory results. However, the ventricles when distended thus may be attacked either for effusion of blood, for acute distention by serum, for a collection of pus, for effusion due to pressure, for brain tumors, and for the diseased condition now under consideration. Not the least of the difficulties in the case is that met with in connection with the fluid which constantly escapes into dressings in which it may decompose and thus permit of infection. In time past a few surgeons have had the hardihood to inject a weak solution of iodine after withdrawal of some intracranial fluid, and though I have read of a few instances in which it was done with impunity there are no records to show just how often it has been fatal, though certainly this has been the case in a majority of instances.

**Basal Drainage.**—In 1893 Parkin suggested trephining of the occipital bone and puncturing of the subarachnoid space; and of five cases treated in this fashion, one of them being a case of tuberculous meningitis, three recovered. In the same year Stephen Paget thought to drain a case of acute meningitis by cutting away the posterior arches of two cervical vertebrae, the fourth and fifth, and although he opened the membranes, the autopsy showed that the drainage was insufficient, and that occipital attack would have been more successful. Drainage at the base of the skull, combined with pressure, has been even more successful. One foreign surgeon made three punctures in a four-months' old baby, and removed altogether 1135 cubic centimeters (more than two pints) of fluid, but improvement was only temporary. Baskett, a British surgeon, operated on a child nine weeks old, tapping the head and removing a half pint of fluid, and a few days later he incised the anterior fontanel, with temporary improvement. The opening between the ventricles closed, after an attempt was made to relieve pressure by an opening on the other side, and the autopsy revealed a plug of pus in the dilated foramen of Monro. And so the matter stands with regard to surgical operations upon the head for hydrocephalus. If this route be adopted, I should advise the insertion of some aid to continuous drainage, as, for instance, a bundle of prepared horsehair introduced through Horsley's dilating director. Not infrequently we have, as a result of tapping, signs of cerebral irritation; e.g., vomiting, cramps, crying, pyrexia, etc. Since puncture, frequently repeated, is hazardous, I hold it good practice to make two or three punctures at most, after which, if marked improvement does not occur, it is best either to discontinue them or to establish permanent drainage.

**Spinal Drainage.**—Thirdly, we have to discuss the question of attack through the lumbar or lumbosacral region. In 1891 Wynter suggested drainage through the

lumbar region by puncture of the membranes. After tapping a three-year-old patient, he maintained permanent drainage by a rubber tube. Much improvement followed for a time, but when the fluid ceased to escape the child died. About the same time Quincke reported ten operations, pressure upon the skull being combined with puncture in the lower spinal region. One of his patients was cured, in three there was considerable improvement, and none of them died. The suggestion to merely puncture has been modified by some who have cut down upon the lumbar vertebrae and either punctured the dural membrane, or, in at least one instance, opened the spinal theca and stitched its edges to those of the skin wound. These more radical measures have never succeeded in giving permanent relief; on the other hand, the method of simple puncture, which I shall illustrate in this case, has been followed in some cases by the best results. According to the last statistics, Quincke has done the operation forty-one times, and values it, not alone for its therapeutic affect, but because of its diagnostic possibilities, since the fluid thus obtained may be submitted to both chemical and microscopic analysis. When the albumen increases beyond the proportion of one part to 1000 there is an acute increase in the degree of inflammation and exudation present; should the fluid be bloody this is still more true.

Next let me call your attention to the anatomical fact that the spinal cord, as such, terminates opposite the second lumbar vertebra, and that a needle point introduced at the lumbosacral junction cannot, at most, do more than injure some particular nerve trunk. There are two or three methods by which this little operation may be performed. In infants the cauda equina is divided into two lateral bundles, separated by a space of half a centimeter, and the distance from the exterior to the cavity of the spinal canal, in infants, is two centimeters, or a trifle more, while in adults it is two or three times that distance. As you see, I make use of an ordinary aspirating needle, which may be passed in quite obliquely toward the interior, between the third and fourth lumbar vertebrae, or at the same level by piercing the skin perpendicularly a little to one side of the middle line; or, the lumbosacro interval may be perforated, after the latter fashion, the needle being directed a little more obliquely, which plan I shall follow in this case. I expect to direct the point of the needle upward and forward through the latter space, because it is larger, and the danger of injury to the nerves is decreased.

I have had a little ether administered so that the baby may not suffer, though it is likely that I could perform the operation in its present mental condition without provoking much evidence of pain. I place the child over the end of the table, with its buttocks projecting, and its legs hanging down, in order to curve the spine and open the lumbosacral space as widely as possible. The skin has been carefully prepared, as has this needle, which has just been taken from boiling water. Entering the needle a little to one side of the middle line I pass it forward in a direction slightly upward, which I know must take it into the spinal canal at a depth of about



2 centimeters. You see that the fluid begins to flow out and so easily that I disconnect the suction apparatus and simply let it escape as it will. Observe now a very interesting phenomenon. The child having partially recovered from the effect of the anesthetic, every time it gasps, or cries, or coughs, we see that the stream of fluid becomes a jet which is spurted out to a little distance. This should remind you that with every expiratory effort blood is forced into the cavity of the cranium and tends to expel the cerebrospinal fluid contained therein. I could give you no better demonstration of what I before alluded to as the law of hydrostatics within the cerebrospinal canal. This is the legitimate but secondary outcome of a scientific surgical operation for the relief of this condition. In this way I permit as much fluid to escape as runs easily, and now that it comes drop by drop I withdraw the needle, make pressure over the opening, seal it with collodion, and over this apply an aseptic dressing.

NOTE.—The child was shown to the class on the fourth day with the mother's statement to the effect that it had seemed less listless and more active than before the operation, while at the same time it had been more irritable and called for more attention on her part. The patient was dismissed with directions to the parent to report for a second puncture at the end of one month. At the expiration of the month the child was again shown to the class. Its condition was certainly improved; it was brighter, noticed things about it, and made ordinary motions with its limbs. The anterior fontanel did not bulge, and there were no signs of increased pressure within.

## MEDICAL PROGRESS.

**The Probable Cause of a Typhoid Epidemic.**—BERRY (*Lancet*, December, 1896) reports the details of an epidemic of typhoid fever which occurred in Grantham during the summer of 1896. No explanation of its origin was obtained by an examination of the water supply, of the milk and food supply, of the sewers of the district, or in the disposal of excrement. A careful study of the history of the epidemic led the writer to believe that the poison was introduced into the subsoil from a block closet in an early case, and that it was disseminated either by ground air or by ground water. This view is supported by the fact that the point where the epidemic commenced is higher than the districts subsequently affected. Further, the sudden cessation of the epidemic (allowing for the incubation period of the disease) coincided exactly with the falling of cold rains, which would check germ growth in the affected subsoil.

**Consideration of the Modern Treatment of Hypertrophy of the Prostate from an Experimental Point of View.**—In view of the widespread popularity of double castration for hypertrophy of the prostate, the results of Sackur's experiments on dogs and rabbits are of interest. In examining the preparations of contracted prostates, Sackur came to the conclusion that the process is not one of

proliferation of the gland cells, then fatty degeneration, and finally disappearance of these cells, nor is the process one of hyperplasia, but is rather an embryonic connective-tissue production rich in the proliferation of cells encompassing the individual acini, which compress the lumen of the glands till these finally atrophy and disappear altogether. The increase in the interacinous tissue is only a relative one, brought about by the disappearance of the glandular tissue. Hence the truth of the assertions of those authors who ascribe better results in those cases where castration was performed for soft hypertrophy of the prostate than in the cases of hard hypertrophy. In the former, there was a great deal of glandular tissue that could undergo atrophy, which could not take place where the hypertrophy was of a fibrous nature.

Sackur further demonstrated experimentally that the removal of but one testicle has but little effect on the reduction of the hypertrophy. In such instances hypertrophy of the remaining testicle takes place. He was able, by section of both vasa deferentia or resection of the same, to obtain complete results. In one case, however, in which no result was obtained, the author could detect a delicate canal which served to connect the severed ends. Section of the nerves of the testicle was followed by the same results as castration. This latter method is precluded in human subjects by the difficulty of the technique. Gangrene of the testicles did not follow either complete section of the vasa deferentia or section of the nerves. Collating the experimental and clinical results, Sackur arrives at the following conclusions: (1) Instead of castration, ligation and section of the vasa deferentia in toto and resection of the isolated vas give equally good results in cases of hypertrophied prostate. (2) Cessation of the testicular function is indispensable to a cure. Single castration is of no avail.

**The Ability of Bacteria to Pass Through Intestinal Mucous Membrane.**—The question of the permeability of the intestinal canal for different kinds of microorganisms has been revived by the investigations of French authors, who claim to have found bacteria in great quantities in the chyle. NEISSER, however (*Centralbl. f. innere Med.*, No. 50, 1896), claims that the chyle, under ordinary circumstances, is entirely free from bacteria, and, although it does not possess any germicidal properties, he did not find any bacteria either in the lymph glands or in the blood vessels associated with the intestines; so he concluded that the intestinal wall was not pervious to them. Nevertheless, the question is not entirely settled, for there seem to be circumstances under which bacteria in the intestines are capable of setting up a general infection, while under other circumstances, countless germs of a highly pathogenic character may remain for days in the intestines without doing any injury.

**The Diagnostic Value of Dental Malformations in Hereditary Syphilis.**—FORTIN (*Gazette Hebdom. de Med. et de Chir.*, No. 96, p. 1149) considers these dental dystrophies more important in the second than the first dentition, though observed in both, and enumerates:

1. Early alterations: Slow eruption, erosions, micro-



dentism, amorphism, softness of the dental system, white ridges, and irregularities of implantation.

2. Secondary alterations: Changes of color, accumulation of tartar, traumatic lesions, caries, stomatitis, and early loss of teeth.

Collectively, these malformations indicate only a nutritive disorder, or an arrested development, and, considered individually, no single one is pathognomonic of hereditary syphilis. Erosions are seen in children who have had convulsions, in the scrofulous, in chronic enteritis, and in idiots. The notching of the superior lateral incisors (Hutchinson), very rare without syphilitic history, is nevertheless seen in the scrofulous.

Tentative treatment is advised in every case of hypodermic injections of mercury and iodid of potassium, care being taken to avoid mercurial stomatitis.

Dental malformation may be hereditary.

## THERAPEUTIC NOTES.

### *Influence of Vapor Baths Upon the Blood Pressure.*—

CERRINA (*Bull. Gen. de Therp.*, January 15, 1897) has conducted a series of experiments in order to determine whether vapor baths can be prescribed without danger in the diseases which affect the circulatory system. He finds that without exception vapor baths reduce the blood pressure. The indications for their use are given by him as follows:

1. In those affections accompanied by increased blood pressure (aortic insufficiency) vapor baths are of service in reducing this pressure.

2. In those conditions which predispose to apoplexy vapor baths are not contraindicated. Indeed, owing to the cerebral anemia which they produce, such baths may act to prevent an apoplectic stroke.

3. In cardiac affections with diminished blood pressure (mitral lesions) a distinction must be made between cases with complete compensation, and those in which compensation is incomplete. In the former cases vapor baths may be used as the diminution of pressure thereby produced is not greater than the diminution which occurs after such baths in health. In uncompensated cases vapor baths are absolutely contraindicated.

*Comparative Therapeutic Value of Active and Passive Exercise.*—SEAYER (*Yale Medical Journal*, March, 1897) concludes an interesting study of the effects of active and passive exercise upon the different systems of the body with the statement that passive movements produce less active, but more complete combustion, and the waste products are in better form for elimination than under more rapid waste production of active exercise. Moreover, there is undoubtedly a possibility of securing a healthful exercise of central nerve-cells by peripheral manipulation.

However, it appears that passive exercise cannot take the place of active exercise in the relief of what may be considered over-charged motor areas in the brain, and that its highest use will be found in such cases of malnutrition and cell exhaustion as occur when debility is the result of overwork and prolonged wear and tear. It

would, therefore, be preposterous to prescribe passive exercise for a person whose central nervous system was irritable from lack of normal discharge of nerve force, and active exercise would be strongly indicated. A converse of this statement is also true, that to prescribe active exercise for a person whose motor areas are all overworked, or whose nutrient processes are poor, would be prejudicial to the future health of the patient. It should therefore be borne in mind when considering the practicability of prescribing exercise that an intelligent choice should be made, as in the use of ordinary drugs; for in no other way can we expect to obtain uniform and satisfactory results.

*Treatment of Tuberculosis of the Larynx.*—Since lactic acid was first recommended for the treatment of tuberculosis of the larynx it has been widely employed on account of its property of attacking only the diseased tissue. BOTEY in order to avoid the severe irritation, with laryngeal spasms which sometimes follows its use, recommends (*Centralbl. für die Gesam. Ther.*, January, 1897) a combination of lactic acid with carbolic acid and glycerin, which possesses, according to his experience, the quieting action of the latter substances with the specific action of the former. He begins with a solution in glycerin of carbolic acid five per cent., and of lactic acid ten per cent. In sensitive patients the use of cocain is advisable. The brush should be introduced three or four times and an energetic application made. The strength of the solution may be rapidly increased until the following is used: Carbolic acid one part, lactic acid three parts, glycerin four parts.

*Radical Cure of Hernia by Implanting a Section of a Sterilized Sponge.*—In the *Bulletin* of the Johns Hopkins Hospital, March, 1897, PLATT describes an operation which he has four times performed for the radical cure of inguinal hernia. The canal is laid freely open. The sac is opened, emptied of its contents, ligated as high up as possible, and removed. A piece of fine, firm sponge the size, shape, and thickness of a silver dollar is sterilized without boiling by immersion in soda solution, sterilized water, permanganate of potash, oxalic acid, and normal salt solution. A radial incision is made in the sponge and it is slipped over the cord. The edges of the cut in the sponge are slightly overlapped and held together by two sutures. The disk of sponge is then spread beneath the abdominal ring at right angles to the cord which pierces its center. The conjoined tendon is then sutured to Poupart's ligament by two or more quilted sutures. The inguinal canal is closed with silk, and the skin with silkworm gut. "It is absolutely necessary to use some kind of drainage in the upper part of the wound, as there is invariably some serous oozing and swelling. This may be removed after twenty-four hours." Platt has performed this operation upon four children, aged four, five, eight, and twelve years. In two of the cases it was necessary to remove the deep sutures on account of a persistent sinus which healed without the removal of the sponge. One of these cases recurred in five months. The other cases were well seven months after operation.

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SATURDAY, APRIL 3, 1897.

## EXACTNESS IN INFANT FEEDING.

IN this issue will be found a mature article on the subject of modified milk, by the originator of this plan of substitute feeding. Prof. Rotch has taught the profession to think in percentages, to feed by figures. Many excellent preparers of adult foods, with a little of this and a pinch of that, set upon the table triumphs of individual skill. It is a notable fact that such masters of the art cannot, as a rule, impart to others their recipe and secure to them like results. Feeding by prescription, estimating by percentages, thinking in figures, an intelligent mutual understanding among physicians—these are some of the features of this exact method.

There have been three important steps in exact infant feeding. The first came from studying the composition of the breast-milk of women nursing infants of equal age, all thriving. It was found that the component parts of such feedings vary greatly (Rotch, Adriance). Disturbances of mind and metabolism, worry and fatigue, influence the milk composition. If a mother worries, the baby has colic; if she gets overtired shopping, a like result. If a stolid wet-nurse sits indoors and gets constipated, the baby is affected. It is now known that this disturbance is due

to a derangement of the proper proportions of the constituents of the milk.

The first step consisted in ascertaining the low and high average percentages of fat, sugar, and proteids in the breast-milk of women nursing thriving infants, when once rapid growth had been established. Such percentages have been found to be, approximately, low average: fat, three per cent.; sugar, six per cent.; proteids, one per cent.; high average: fat, four per cent.; sugar, seven per cent.; proteids, two per cent. In earliest infant life, when there is no breast-feeding, there is a departure from these standards, likewise in normal conditions of the infant's digestive capabilities.

The second step consisted, after having learned the variations of breast-milk, in procuring a substitute feeding capable of equal variation. Practically, cow's milk is the only substitute for mother's milk. At the outset, the problem has been to convert the percentages—fat, 4 per cent.; sugar, 4.5 per cent.; proteids, 4 per cent.—to the above-mentioned high and low average percentages of breast-milk. Dr. Rotch has studied the first and second steps in a masterful manner. He has studied Nature's variations, and has thereto adapted substitute variations:

Low average—Fat, 3 per cent.; sugar, 6 per cent.; proteids, 1 per cent.

High average—Fat, 4 per cent.; sugar, 7 per cent.; proteids, 2 per cent.

Cow's milk—Fat, 4 per cent.; sugar, 4.5 per cent.; proteids, 4 per cent.

His aim has been to take cow's milk apart and put it together in the proportions of breast-milk, to add lime water to tip the balance from acid to alkaline, heating it enough to insure its freedom from pathogenic germs. He does not put into the milk cane-sugar; he does not put into it cereals; he does not put into it patent prepared commercial foods. With his eyes upon Nature's lines of variation, he prescribes a varied substitute.

The third step consisted in making it possible to adapt this study to practical purposes. Prescription writing, laboratory compounding, exact dosing, is as fruitful of good results in feeding as in pharmacy. It is everywhere evident in the writing of Dr. Rotch that the study of infant feeding, for which he will always be known, has begun with the dairy and continued to the nursery. Clean cows and clean stables, clean milkers and clean pails, rapid cooling and

quick transportation have been emphasized. Good milk, carefully handled, exactly modified, and intelligently prescribed—this is the accomplished work, which future writers will dwell upon with unstinted praise.

In pediatrics there is nothing more important than feeding. In feeding there is no method comparable with that of modified milk. The graduate of fifteen-years' standing has seen added to pediatric practice three great aids: intubation, antitoxin, and exactness in infant feeding.

#### THE MODERN TRAINED NURSE.

BOTH lay and medical British journals have, of late, discussed the modern trained nurse from a sociological and professional standpoint. The chief lay critic, Lady Priestley, denounces the private nurse as "arrogant, dictatorial, flighty, frivolous, overtrained, underbred, an *intrigante* of the first water, a matrimonial adventuress, and an expensive luxury of doubtful utility." An English opinion on this subject demands some respect, as it was in Great Britain that the trained nurse was first evolved. It cannot be denied moreover that some of the painful experiences of Lady Priestley have been ours, and a short discussion of the subject is therefore not out of place.

Whatever faults or shortcomings a trained nurse may have, we may rest assured that the factors governing her selection, training, and after-management are largely responsible. The semiprofessional nature of the occupation imparts a sort of glamor which attracts more than the compensation and, it must be confessed, the class thus attracted seldom make the most desirable nurses. Feeling themselves too good for domestic service or employment in factory or shop, they see in nursing a sphere of intimate usefulness where indulgence, more than desert, has accorded them a social status to which some condescend to let themselves down, and to which others rise with undisguised satisfaction. That this anomalous, and often undeserved social standing, is sometimes taken advantage of is true. Too many immature women are admitted to training schools, and too many with unchangeable and improper ideas of the position and functions of a nurse. Once admitted, the period of probation is too short and the weeding-out process during, and at the close of this period, is too restricted. The curricula of most schools are too theoretical.

Courses of study and lectures, on subjects better left alone, consume time and strength which should be devoted to practical work. This is partly the physician's fault, as he it is who lectures too frequently "over the nurses' heads." Often, however, the managers, or the principal, map out the lectures, which frequently are as inappropriate in training schools for nurses as conic sections in a kindergarten.

Again, in undergraduate life too much is made of the supposed hardships of nurses, and they are entertained, coddled, and housed in palatial quarters until thoroughly spoiled for their real life-work. Treated often with more consideration and quartered more sumptuously than the house staff, whose servants they are, what wonder that they sometimes become "arrogant" and "dictatorial," as Lady Priestley says, when graduated and free lances in the community.

If judiciously selected and properly trained, the modern nurse is an unmixed blessing. Faithful to patient and loyal to physician, how much suffering she saves one, and how much anxiety the other! "Flighty," "frivolous," or "underbred" they never could be if properly selected; "arrogant," "dictatorial," or "overtrained" they never would be if properly taught; and, if they sometimes stoop to "intrigue" or "matrimonial adventure," who dare deny that the physician sometimes sets them the example.

Having nothing to do with the admission of nurses to training schools and little to do with their instruction, the profession has to take them as they are; but it lies in the power of physicians by firm and concerted action to keep an undesirable nurse out of employment, and in that way save the public or profession from her blighting presence. The selection or retention of a nurse generally devolves upon the physician, and he has himself to blame if a nurse, found to be disloyal to him or unfaithful to his patient, continues to prosper.

What is really a fact to be deprecated is that overproduction and a predilection on the part of some employers and physicians for the young, fresh, and pretty, have crowded the older, more experienced, and hence, really more desirable nurses out of private employment. This deplorable condition has not proved an unmixed evil, however, for, while those of the profession who appreciate faithfulness and experience in a nurse rather than youth and comeliness, have lost trusty helpers, the poor have been gainers, as many



of these veterans have taken up district nursing, in which occupation they get a small regular salary and do an immense amount of good among the poor, not only ministering to their physical ills, but also doing invaluable missionary work in matters of cleanliness and hygiene.

With all her virtues and all her faults, we must remember that the trained nurse is a woman, and that the lines of Scott apply to her as well as to the rest of her sex:

"When pain and anguish wring the brow,  
A ministering angel thou!"

#### THE CANADIAN MEETING OF THE BRITISH MEDICAL ASSOCIATION.

"POLITELY but firmly," says the *Medical Press*, "measures are being taken to point out that the meeting of the British Medical Association at Montreal, in August next, is not intended for the 'οι πολλοι of the American profession of the United States, but that it is distinctly a gathering of the members of the Association, together with certain specially invited guests."

There can be no reasonable objection to the Association making such arrangements as will best conduce to the success of the meeting in accordance with its highest objects and aims, but it is just possible that this can be more "politely" done than has been attempted in this brusque venture of our excellent contemporary. However, it is important that the members of the profession should comprehend the circumstances under which the Association meets this year in Montreal, and so avoid any embarrassment or irritation that might arise from misunderstanding.

"We're a great people, that's beyond a doubt,  
And nothing loth to let the secret out."

The officers of the British Association have evidently heard of it, and have also learned that the American profession believe in the benefits derived from an interchange of ideas and experiences and have a commendable proclivity for attending medical meetings for that purpose. They are evidently afraid, and perhaps justly so, that they will be completely swamped at Montreal by the American contingent.

The committee of honorary local secretaries has candidly set forth the situation in a communication to the *Medical Record*. In this the com-

mittee points out the fact that it is doing all in its power to have as many friends present as can safely be invited. Not more than a few hundred Old-country members can possibly be expected, Canada with her sparse population will be represented by hundreds not thousands, and the other British colonies and dependencies by a limited number of delegates; "and were we to throw the meeting open to the medical men in attendance upon the sixty-six million inhabitants of the United States, the whole character of the meeting would be destroyed—it would no longer be a meeting of the British Medical Association, but would assume the nature of an American medical congress with British officeholders."

For the British Medical Association to be so completely swallowed up the first time it ventures out of the confines of its sacred dominions would be sad indeed. If, however, it be true that many practitioners, especially in the West, were intending to neglect the meeting of the American Medical Association in Philadelphia, reserving their time and money for a trip to Montreal, the danger was imminent, and they do wisely to anticipate it. With the meeting of the Congress of American Physicians and Surgeons at Washington in May, and that of the American Medical Association at Philadelphia in June, sufficient opportunity will be afforded this season for indulgence in the American proclivity and for the craving for scientific pabulum to be amply satisfied. We heartily endorse the suggestion of the *Record* when it says: "We sincerely hope that no American will be seen in Montreal at the meeting of the Association who does not go as an official delegate from some society empowered to send him, or in response to a personal invitation from some one in authority."

#### ECHOES AND NEWS.

**Dr. T. A. Emmet Honored.**—The Council of the College of Notre Dame, at South Bend, Ind., has conferred on Dr. Thomas Addis Emmet of New York the Laetare medal. This is in accordance with the annual custom of the institution to do honor to some eminent American Roman Catholic.

**Antitoxin—American Pediatric Society.**—The collective investigation (report) will be kept open until April 10th, in order to secure returns of all cases beginning before April 1st. The committee desires to express its appreciation of the trouble and pains the profession has been willing to take in this matter. The return blanks have been more complete and accurate than in the first report.

**The New York County Society on Compulsory Reports of Phthisis.**—This society, at its recent meeting, rejected the report of its committee sustaining the action of the Board of Health, and adopted the following: Resolved, that in the judgment of this society, the recent edict of the Health Department in relation to the compulsory reporting of cases of tuberculosis is unnecessary, inexpedient, and unwise.

**Opening of the New Lecture Room of the Boston Infants' Hospital.**—On March 17, 1897, Dr. W. P. Northrup, Professor of Children's Diseases in the Bellevue Medical College of New York, addressed, by invitation, the students of the Harvard Medical School on "Tuberculosis in Children." The lecture was illustrated by lantern slides. It was a great success, and excited much interest.

**Corsets Abandoned.**—The latest exploit with the Röntgen rays is reported from Lisbon. It was at the instance of the Queen of Portugal, who takes a keen interest in science, that the ladies of her court submitted themselves to the searching action of these vibrations. The ladies have been startled at the sight of their distorted ribs and bones, the result of tight lacing. Henceforth they have determined to be free women. Corsets are to be cast aside.

**A Barbarian Notion of Sanitation.**—The natives of the village of Ixtlan, Mex., have taken a genuine Indian method of stopping the spread of smallpox, which appeared in that town. The first man to take the disease was the alcalde of the pueblo, and the Indians concluded that the place to stop it was at the fountainhead. They appointed executioners, who went to the house of the alcalde and beat him to death, and then set fire to the house and burned it and everything that was in it, including the body of the murdered man.

**Hospital Shaken by an Earthquake.**—Shortly after midnight on March 27th Montreal was visited by a startling earthquake, the second within the week. Its force was thought to have been especially great in the vicinity of the Notre Dame Hospital. The chimney-caps were thrown to the sidewalk and the walls of the building severely agitated. The inmates were greatly demoralized by the shock which aroused them suddenly from their slumbers, and order was with difficulty restored by the sisters and house-staff.

**Fanaticism in Bombay.**—One of the London daily papers prints a despatch from Bombay, which says that the fanatical Mohammedans there display the bitterest opposition to the measures taken by the government for suppressing the bubonic plague. For instance, a Mohammedan, while leaving the city with his wife, refused to allow her to submit herself to the prescribed inspection. The officials insisted, whereupon the Mohammedan suddenly drew his dagger and stabbed her to the heart. Then he stabbed the official physician and attempted to kill himself.

**The Widal Agglutination Test for Typhoid Fever.**—Dr. Wyatt Johnston recently stated that in the application of

this test to more than six hundred cases his confidence in its reliability had not been in any degree diminished. The peculiar reaction was occasionally delayed until the fifth day, and in rare instances would disappear after the fifteenth day. Certain somewhat similar reaction had also been observed from the blood of patients ill of other diseases, but a little experience should enable the careful observer to recognize the characteristics of the typhoid reaction from any of these.

**The Bald Man's Bacillus.**—Dr. Sabourand has reported to the Dermatological Society of Paris that premature baldness is chiefly due to the ravages of a bacillus which takes up its abode in the fatty cells lying about the roots of the hair. Whether this parasite consumes the nutrient provided by nature for the support of the capillary crop or secretes a "toxin" that is fatal to the hirsute growth seems to be as yet undecided. The eminent physiologist has succeeded in cultivating the creature after the most approved Pasteurian methods, and a sheep inoculated with the virus showed bare patches of a most gratifying nature. The next step will be to develop an antitoxic serum and immunize the descendants of the occupants of the "baldheaded row."

**Guilty of Having "Knock-out" Drops.**—Charles Guichard, a jeweler's apprentice, was convicted in General Sessions March 24th of having "knock-out" drops in his possession. It was the first conviction under the law passed March 9 making it a felony for any person other than a regularly licensed physician to have poisonous or anesthetic drugs in his possession. Guichard's offense was committed March 11. He went to a drug store in Bleecker street and offered the clerk \$15 for some hydrate of chloral, vulgarly known as "knock-out" drops. The clerk told him to come back later, and in the meantime notified the police, who waited until Guichard had put the mixture in his pocket, and then arrested him. Guichard's defense was that he had bought the drug for a woman, who offered him \$50 for it. The maximum penalty for the crime is ten years in State prison.

**Hygienic Measures Before the New York Legislature.**—The committee on public health has under consideration a bill prohibiting the cutting of ice for any purpose within one thousand feet of the outlet of any sewer, or within or opposite the corporation limits of any city or town having over fifty thousand inhabitants. The committee on ways and means is considering a bill requiring that every building or room occupied as a butcher's shop, meat market, or fish market, or in which meat or fish intended to be used for food is exposed for sale or stored, shall be under the jurisdiction and subject to the inspection of the factory inspector, or a deputy factory inspector duly authorized by him. The factory inspector may adopt such rules and regulations in relation to the construction, ventilation, drainage, plumbing, and maintenance of such buildings or rooms as he deems necessary to secure the healthful, cleanly, and sanitary condition thereof.

**Obituary.**—Dr. Douglas Ewell died on March 24th, in his apartments, in New York. He was thirty years old

and unmarried. He was born in New York, and was demonstrator of anatomy at the College of Physicians and Surgeons. He was also connected with Roosevelt Hospital.—Dr. Thomas Scott Lambert of New York, who died last Sunday at Stamford, Conn., was widely known several years ago as a writer and lecturer on educational and physiological topics. "Lambert's Anatomy" was a text-book in the public schools of various large cities between thirty and forty years ago. Dr. Lambert was born near Boston, Mass., on May 22, 1819; was educated at Williams College, and took his degree in medicine at Castleton, Vt. He became a specialist in anatomy and physiology, and spent the greater part of his life in lecturing on those subjects. He published his text-book on anatomy about forty-five years ago, and in recent years he undertook to revise that work, but his mental faculties became impaired by overwork, and he spent the latter part of his life in a quiet retreat in Stamford.

**Antitoxin of the Bubonic Plague.**—Dr. A. H. Doty, Health Officer of this port, assisted by Dr. T. D. Fitzpatrick, has been experimenting to discover an antitoxin for the bubonic plague, and recently made a report to the New York Health Board. In the report he says: "On February 26 a horse was inoculated with a culture of plague bacillus. This was repeated on March 4 and 9. In order to determine how early the serum might have acquired antitoxic qualities, about a pint of blood was drawn from the horse on March 15 for experimental purposes. From this, one-half a pint of serum was secured. Several white mice were each injected with one cubic centimeter. After thirteen hours they were inoculated with a culture of the plague bacillus. These all remained alive. Several into which serum was not injected, when thus inoculated, died, showing the efficiency of the serum in the cases of those that lived. These results would indicate that the serum in this horse will surely be both preventive and curative."

**The Medical Buckeye Flyer.**—Arrangements have been made for a special train, which will be known as the "Medical Buckeye Flyer," which will be made up of Pullman palace cars, for the accommodation of those who cannot conveniently reach the *Journal Special* on account of the locality in which they live. This train will go via Columbus, Ohio, where it will be joined by many of the military surgeons, who hold their annual meeting in that city just prior to the meeting of the American Medical Association. It will be a through train, without change of cars, to Philadelphia, over a route both picturesque and historic. Reduced rates will be made and the best of accommodations provided, care being taken with regard to the comfort of the passengers in avoiding overcrowding of cars. Stop-over privileges at Washington have been arranged for without extra charge. Those who desire to take this train will receive further information by addressing DR. R. HARVEY REED, Columbus, Ohio.

**The New York Academy of Medicine and the Control of Tuberculosis.**—The committee appointed by the Academy

of Medicine to consider the question of the control of tuberculosis presented its report, which was adopted, as follows: (1) In the opinion of this committee, the Board of Health might wisely delay the enforcement of compulsory notification, but should adopt more stringent measures for the care of sputum in factories, workshops, tenement-houses, ferry-boats, places of public assemblage, and public conveyances. (2) The establishment and maintenance by the city of a hospital or hospitals, to which indigent tuberculous patients may be admitted, is advisable. (3) This committee recommends the appointment by the Legislature of a commission for the establishment and management of sanatoria in healthy country districts in this State for the care of the indigent tuberculous patients in the early stage of the disease. (4) This committee commends to the State Board of Health the importance of the careful regulation of the sanitary condition of hotels and sleeping-cars throughout the State. E. G. JANEWAY, M.D., Chairman; T. MITCHELL PRUDEN, M.D., Secretary.

**New York School Physicians and School Inspectors.**—Some confusion has arisen in medical circles in regard to these two classes of public servants. The positions and duties are entirely distinct. The duty of the inspectors, of whom there are one hundred and fifty, is to visit their respective schools at nine o'clock every morning during the session. Upon assembling in the morning, every child that appears ill, or who presents himself for the first time after being absent, is sent to a special room, where he is inspected. If found attacked by an infectious or contagious disease, or not fully recovered from one, the inspector sends him home, with a note to that effect, and at the same time informs the Board of Health of the fact. The salary of the school inspector is thirty dollars per month. The duty of the physicians, of whom there are ten, is to examine all applicants for positions as teachers in the public schools. Like the police and fire departments, the Board of Education requires of all applicants for positions on the teaching staff a certificate from one of the school physicians attesting to the physical soundness of the applicant. The following have been appointed school physicians for the year 1897: W. Gill Wylie, Samuel M. Brickner, John G. Truax, P. J. Lynch, Josephine Walter, John Rogers, Jr., Clement Cleveland, Matthias Nicoll, Jr., Alexander Lambert, A. M. Jacobus. The fee for each examination is \$3.

**Dr. Koch's Rinderpest Cure.**—In his recent report to the Department of Agriculture, Dr. Koch says that the blood serum of cattle which have recovered from rinderpest has a certain immunizing effect upon healthy stock when inoculated with it. Its protective properties, however, are not very great, for 100 cubic centimeters of such serum are required to protect an animal against an inoculation with a small dose of rinderpest blood. This immunity is in its nature merely a "passive" one, and will only last during a short period. "For protective inoculation on a large scale such serum is not applicable, but I succeeded in immunizing within a fortnight several animals by means of a mixture of serum and virulent rinderpest blood to such a



degree that they were enabled to withstand an injection of twenty cubic centimeters of rinderpest blood, a ten-thousandth part of which is a fatal dose. A second and equally important fact is that one is able to render immune healthy cattle with the bile of such as have succumbed to rinderpest. In this case, only one hypodermic injection of ten cubic centimeters is sufficient. This immunity sets in on the tenth day at latest, and is to such an extent that even four weeks afterward forty cubic centimeters of rinderpest blood could be injected without any injurious effect. I therefore conclude that the immunity produced in such a manner is of an "active" nature. The local result of an injection is merely a hard, somewhat painful swelling of the size of a man's fist, which gradually disappears in the course of a few weeks, provided, however, that the bile is not in a state of decomposition, as is not uncommon when an animal suffers from rinderpest."

*The Regulation and Control of Dispensaries.*—The following bill has been introduced in the New York Legislature:

"Section 1. A 'dispensary' is hereby defined to be a place, established by any person, persons, or corporation, for the practice of medicine and surgery, and to give medical and surgical aid or treatment gratuitously to poor persons who are unable to pay therefor.

"Sec. 2. No person shall apply for such treatment in any dispensary, nor shall any person, persons, or corporation conducting such dispensary, give treatment or medical aid to any person, unless such person so applying for such treatment shall be a poor person and unable to pay for medical treatment; and all persons who are entitled to be so treated shall be treated by such dispensary free from charge for services so rendered, and shall be furnished with the necessary medicines or appliances required by such treatment.

"Sec. 3. In no case shall any person, persons, or corporation conducting such dispensary, directly or indirectly receive any pay or compensation whatever for the treatment of any such persons entitled to be so treated, nor be entitled to or receive any pay or compensation for the medicines or appliances so furnished, and no person who is not a poor person shall be so treated in such dispensary, except in cases of emergency.

"Sec. 4. No dispensary shall be carried on or conducted in any place, commonly known as a drug store or a place for the sale of drugs or medicines, nor shall the same be carried on in any place commonly known or defined by law or by the rules and regulations of any health board or health department as a "tenement-house."

"Sec. 5. All persons desiring to avail themselves of the right to be so treated in any such dispensary shall produce to the person, persons, or corporation so carrying on said dispensary a certificate in writing from the owner or owners of the premises wherein said person resides, or from the police captain or person in charge of the police district or precinct in which he or she resides, or from the alderman of the district, or from any charity organization, that the said applicant is a poor person, unable to pay for

medical treatment or medicines; and such writing shall be in the form prescribed by such dispensary, and be of no force and effect after the expiration of thirty days from the date thereof.

"Sec. 6. Any person who shall apply to such dispensary to be treated who is not a poor person, or shall obtain treatment or medical aid at such dispensary when he or she shall not be entitled thereto under the provisions of this act, the person so applying or so receiving such treatment or medical aid, and any person or persons who shall aid such person so applying to be treated in such dispensary, or who shall sign such certificate, knowing that such person so applying to be treated is not a poor person, shall be deemed guilty of a misdemeanor.

"Sec. 7. Power and authority is hereby conferred upon the societies known and designated as follows, namely: The New York County Medical Society, the New York Homeopathic County Medical Society, New York Eclectic County Medical Society, New York County Medical Association, the New York Medical Society for Advancing the Practice of Medicine, the Harlem Medical Society, the Eastern Medical Society, the German Medical Society of the City of New York, and the United Charities of the City of New York, under the certificate of appointment signed by its president and secretary and attested to by its corporate seal, to nominate and appoint one person who, with the persons to be selected by all of said societies, shall compose a board to be known as the 'Medical Board for the Supervision of Dispensaries Within the City of New York,' and such board shall have power to make such rules, regulations, and by-laws for its organization, government, and management; to adopt such rules and regulations with reference to the establishment, management, mode, and manner of carrying on and conducting such dispensary, and provide for the supervision thereof, and to adopt such rules and regulations with regard thereto as in the judgment of said board may be necessary for carrying out and giving force and effect to the provisions of this act, and upon the adoption thereof to cause the same to be distributed among such dispensaries, and all such dispensaries now in existence or hereafter to be established shall be subject to such rules, regulations, and by-laws, and subject to the supervision of the said board. Any vacancy in said board shall be filled by an appointment by the society to which the member belongs whose death, resignation, or inability to act created the vacancy.

"Sec. 8. Any person or persons or corporation so conducting or carrying on a dispensary, and violating any rules, regulations, and by-laws so made by said board after notice of the adoption thereof, and who shall fail to comply with any of such rules, regulations, and by-laws so adopted by said board, may be prosecuted by said board, or any officer thereof, and, upon conviction thereof, be deemed guilty of a misdemeanor, and shall be punished by a fine of not less than fifty dollars or more than two hundred and fifty dollars, or by imprisonment of not less than one month or more than six months, or both such fine and imprisonment for the first offense, and six months imprisonment for each subsequent offense.

"Sec. 9. The husband and wife shall be jointly and severally liable to pay for professional services of a physician rendered to them, or either of them, or any member of their family, and the joint or several property of the husband and wife shall be liable to levy and sale under an execution upon such judgment, except such property as may by law be exempt from levy and sale under an execution.

"Sec. 10. This act shall take effect immediately."

## CORRESPONDENCE.

### THE MEETING OF THE AMERICAN MEDICAL ASSOCIATION.

*To the Editor of THE MEDICAL NEWS.*

DEAR SIR: May I call the attention of those of your readers who are thinking of coming to Philadelphia to attend the semi-centennial meeting of the American Medical Association to be held June 1, 2, 3, and 4, 1897, to the fact that there will be, in addition to the American Medical Association, at the same time a large mercantile convention, which will, to a certain extent, utilize a considerable number of the rooms in the various hotels. For this reason, it is advisable that physicians who intend to be present at the meeting should write at once to one of the following hotels engaging such rooms as they desire at the rates named:

HOTEL WALTON, Broad and Locust streets; \$1.50 and upward per day, European plan; \$4 and upward per day, American plan.

THE COLONNADE, Fifteenth and Chestnut streets; \$1 and upward per day, European plan; \$3 and upward per day, American plan.

THE LAFAYETTE, Broad and Chestnut streets; \$1 and upward per day, European plan; Table d'Hôte: breakfast, 25 cents to \$1; luncheon, 75 cents; dinner, \$1.25.

THE BINGHAM HOUSE, Eleventh and Market streets; \$2.50 and upward per day, strictly on the American plan.

HOTEL STENTON, Broad and Spruce streets; \$2 and upward per day, European plan; \$4 and upward per day, American plan.

THE CONTINENTAL, Ninth and Chestnut streets; \$3 and upward per day, strictly on the American plan.

THE WINDSOR, Eleventh and Filbert streets; \$1 and upward per day, European plan; \$2 per day, American plan.

THE STRATFORD, Broad and Walnut streets; \$1 and upward per day, European plan only.

GIRARD HOUSE, Ninth and Chestnut streets; \$2.25 to \$3 per day, strictly on the American plan.

HOTEL HANOVER, Twelfth and Arch streets; \$2.50 per day, strictly on the American plan.

ALDINE HOTEL, Chestnut street, above Nineteenth; special rates to members of the American Medical Association, \$2.50 per day on the American plan; \$1 to \$3 on the European plan.

The price quoted in each instance is for one person only.

Rooms commanding only the lowest price are naturally limited in number. It is especially desirable that each member intending to be present at the meeting shall personally, or by letter, make his arrangement with the hotel at which he desires to stop. It is worthy of note that the rate of \$1.50 per day at the Hotel Headquarters, the "Hotel Walton," is the rate for two people in one room.

All these hotels are within a few blocks of the meeting places, and most of them are within two blocks.

As a sub-committee of the general Committee of Arrangements has arranged clinical courses in all branches of medicine at the various teaching institutions and large hospitals during the week prior and following the week of the association meeting, it has been thought that a considerable number of physicians would be glad to embrace the opportunity of brushing up upon the various branches by attendance on these courses, for which no charge will be made by the gentlemen giving them, and as their stay in this city will therefore be more than a few days, it has occurred to the committee that some of the visiting physicians may wish to take rooms at some good boarding house. The Chairman of the Committee on Reception and Accommodation, Dr. G. E. de Schweinitz, 1401 Locust street, will be glad to send the addresses of such boarding houses to gentlemen desiring to stay here for a week or more.

The large number of gentlemen who have already signified their intention of attending the meeting, and the very large number of able and interesting papers already placed upon the section programs, indicate that this will be the most important meeting which the Association has ever had, and it is hoped that every physician who is a member of a regularly organized county medical society will make an effort to attend. The meeting halls for the various sections are situated so close to one another that different papers in different sections can be readily listened to during a single morning's session by those who do not wish to devote their time to one particular specialty.

Very truly yours,

H. A. HARE,

Chairman of the Committee of Arrangements,  
American Medical Association.

PHILADELPHIA, March 24, 1897.

### OUR PHILADELPHIA LETTER.

[From our Special Correspondent.]

THE ANNUAL COST OF ENTERIC FEVER—NEUROLOGICAL SOCIETY OF PHILADELPHIA—PATHOLOGICAL SOCIETY OF PHILADELPHIA—PHILADELPHIA COUNTY MEDICAL SOCIETY—ELECTIONS TO THE EPISCOPAL HOSPITAL STAFF.

PHILADELPHIA, March 27, 1897.

A FORCEFUL illustration both of the mortality from, and the monetary expenditure due to, enteric fever may be found in the statement made by Professor Mason of the Rensselaer Polytechnic Institute, in a recent lecture before the Franklin Institute, to the effect that the annual money loss in Philadelphia from typhoid fever is computed at more than one and one-quarter million dollars. In the five years, from 1890 to 1895, the average number



of deaths annually from this disease was 523, and, rating each life as worth \$2000, it will be seen that \$1,046,000 of the estimated sum is accounted for, to which must be added the cost of 523 funerals at the low estimate of \$25 apiece, making a total of \$1,059,075 for those cases which end fatally. So much for the fatal cases; but Professor Mason does not forget that for each death from typhoid there are at least nine recoveries. Thus, 4707 recoveries, each ill for forty-three days (the average length of the disease as shown by an analysis of 500 cases in the Pennsylvania Hospital) take out of the taxpayers' pockets \$202,401, reckoning each individual as earning one dollar a day. For physicians' fees and for nursing, at \$25 for each case, for the total number of cases ill from the disease, \$130,750 more is spent. The aggregate foots up the large total of \$1,592,226; and, inasmuch as a system of water filtration, which would largely eliminate this waste of lives and money, is one of the questions of the hour in this city, the above statement appears to be especially timely. The consequences of a polluted water supply may not particularly impress our city legislators, when viewed from a standpoint of humanity, but can these figures of Professor Mason's, stated in cold dollars and cents, fail to impress the average practical politicians?

At a meeting of the Philadelphia Neurological Society, held on the 22d instant, Dr. Charles K. Mills showed two interesting cases of hereditary tremor. One case was that of a man in whom tremor of the head was present, apparently being produced by excitement, and allayed in a measure by recourse to alcoholic stimulation; the other case was one of tremor affecting the arms and head, in a girl of seven years. Dr. Mills, in his remarks on these cases, was inclined to look on them as diplegia, rather than tremor.

A case of isolated, bilateral paralysis of the abducens nerve, following an injury to the mastoid process was presented by Dr. A. G. Thomson. Dr. James Tyson, in the discussion following a paper by Dr. Joseph Leidy on neuralgia of the cranial nerves as a symptom of uremia, claimed that neuralgia of this type, being so common to other conditions, could not be considered at all conclusive, and added that the result of the urinary analysis would readily determine the condition.

Among the papers read at a meeting of the Philadelphia County Medical Society, held on the 24th instant, was a communication by Dr. H. A. Hare on the value of intravenous injections in the treatment of toxemia, giving the reports of two cases, one diabetic, the other uremic, in which he had employed this measure. The former case, a diabetic, of advanced years, with gangrene of the toe, during an acute toxemia received an intravenous injection of one quart of salt solution, and, after an improvement lasting twenty-four hours, died. The latter case, one of chronic parenchymatous nephritis, with widespread edema, and symptoms of uremia, improved after receiving two injections of one quart each, administered at intervals of ten days. Dr. Hare thought that the danger of air embolism from intravenous injections was overestimated, and stated that in neither of the cases quoted above were there any symptoms of a dangerous character, although

air emboli were produced in both. An instance of remarkable deformity of the fingers from gout was also shown by Dr. Hare. The case was being treated by the hot-air method, with astonishing improvement, the nodules becoming a healthy red color—not the discoloration of an inflammatory process—softer, and partially absorbed, and there was much freer movement of the affected fingers. Two days after the beginning of the treatment, the patient had an acute, widely distributed attack of gout, which was perhaps due to the absorptive action of the high temperature, which at times reached 310 F., on the sodium urate deposits, in consequence of which they were melted down, and carried to other parts of the system. An interesting point in connection with this case was the fact that a skiagraph of the patient's hands showed that the Röntgen ray passed through the sodium urate deposits, evidences of these nodules being wanting in the print.

Dr. A. E. Roussel reported four cases of glandular fever occurring in the same family. His remarks pertained to the infectious nature of the unusual malady, to the differential diagnosis between it and scarlet fever, mumps, and the various forms of adenitis, and included a comprehensive review of the literature of the subject. Dr. J. C. Wilson, who opened the discussion on Dr. Roussel's paper, was inclined to urge caution in accepting a new nosological entity, and thought that some relation could perhaps be made out between glandular fever and scarlet fever.

At the last meeting of the Pathological Society, held on the 25th instant, Dr. A. E. Taylor reported the blood changes which occurred in an individual who had ingested several ounces of tri-nitro-benzol. Marked alteration in the staining properties of the neutrophilic granules was noted, these granules becoming oxyphilic, and staining readily with eosin, and with aurantia. There were no evidences of hemolysis, the erythrocytes staining normally, nor was there hemoglobinemia. When the patient recovered from the poison, twenty-four hours later, it was found that the granules of the polymorphonuclear leucocytes had resumed their accustomed reaction toward the neutral elements of the triple mixture.

Dr. H. L. Williams exhibited a dermoid cyst of the ovary, containing four teeth, a large roll of hair, and a well-developed mammary gland with the nipple.

Dr. G. A. Muehleck reported a case of primary carcinoma of the thumb, and gave the statistics bearing on this infrequent lesion. Dr. Muehleck took the view that carcinomata of this locality, in contradistinction to sarcomata, gave a favorable outlook.

Kaiserling's method of preserving the color of pathological specimens was spoken of by Dr. J. P. Crozer Griffith, who detailed the technic of the process, and gave his experience with its use in a number of instances.

Other communications at this meeting were made by Dr. Joseph McFarland, who showed several phleboliths from the pelvic veins of a case of malignant disease of the pelvis, and by Dr. D. Riesman, who reported a case of amyloid degeneration of the suprarenal body, without pigmentation of the skin, or other symptoms of Addison's disease.



At a meeting of the Managers of the Episcopal Hospital, held on the twentieth-fourth instant, Dr. Elliston J. Morris was elected Visiting Physician to the hospital; Dr. Clarence J. Garitee, Physician to the Medical Dispensary; and Dr. Charles H. Weber and Dr. Eugene Stadelman, Resident Physicians.

### OUR PARIS LETTER.

[From our Special Correspondent.]

#### FRAENKEL'S TREATMENT OF LOCOMOTOR ATAXIA— MOTSCHUTKOWSKI'S SUSPENSION TREATMENT FOR TABES.

PARIS, March 10, 1897.

FRAENKEL, whose treatment of the incoordination of locomotor ataxia attracted considerable attention when he first began to practise it at Heiden in Switzerland, has been for nearly a year now demonstrating his method on patients at the Salpêtrière in Paris. His success has been such as to warrant the belief that his method of treatment carefully, patiently, and properly applied, will do much to relieve the most distressing symptoms of tabes in the great majority of cases. When he first came to the Salpêtrière some of the worst cases of ataxic incoordination in the service were put in his hands for treatment. Two of the patients had been bedridden for years, but all were distinctly improved after treatment. One of these, a woman who had not stirred from her bed for six years, now is able to go out into town alone with the help of a single cane. She can go up and down stairs, and can even walk with her eyes shut, yet the other symptoms of tabes remain (the absence of knee-jerks, the Argyll-Robertson pupils, etc.), and there seems never to have been an hysterical element in the case. Some time ago Professor Raymond announced the results of the Fränkel treatment as applied to a number of cases of tabes, taking them just as they came to his service in all stages of the disease. In over seventy-five per cent. of the cases there had been distinct improvement noticed.

The method is an extremely simple one, and consists only in teaching the patients to make the movements necessary for any given action with exactitude. In walking, for instance, the patient is made to stand up as straight as possible, and to advance one foot a certain distance, but without slinging it, and then to place it once more beside the other. Then he puts it a certain distance forward and to one side, and takes it back again; then to the rear and replaces it. Then he goes through the same movements with the other foot. At first his feet will need the constant supervision of his eyes, but after awhile he will be able to dispense with that. Gradually his eyes may be fixed farther and farther away from his feet, but on some fixed object that will help his equilibrium, until finally the walls of the room at the height of his eyes will be sufficient, or even the ceiling, and then with eyes shut he can accomplish all the movements. The important points with regard to the exercises are that they should not be overdone, and should be carried out with the greatest possible exactitude. The avoidance of over-exercise is very important because ataxics, owing to loss of muscular sensi-

bility, are devoid of proper sense of muscular fatigue, and may easily be encouraged to pursue exercises that cause exhaustion rather than education of muscles. The impaired nerve paths quickly resent the passage of unaccustomed impulses, and the intensity of attention required to carry out the exercises properly soon induces cerebral fatigue. For these reasons Dr. Fränkel insists that patients should not be asked to exercise for more than ten minutes at a time, with an interval of at least ten minutes, after which the motions may be repeated once more, usually not oftener. Twice a day such a *séance* of a half hour may be given. Exactitude in the accomplishment of the motions decided upon is the whole secret of the treatment.

When patients are bedridden, or when they are not easily able to stand up during the exercises, the purpose of the motions may be made more definite by putting around one leg a garter to which, in place of a buckle, is affixed a metal plate. The heel of the other foot is made to touch this plate, placed at different heights on the leg, until the patient can accomplish the purpose readily even with eyes closed. Variety in the exercises is to be sought for, for they must be continued for weeks, sometimes for months, and Fränkel insists that the true end of the exercises must never be allowed to sink out of view. Not muscular exercise in the ordinary sense of the word, such as may be obtained from the repetition of any movement, is the end, but the reeducation of muscular attention by the careful repetition of movements with an exact and definite purpose.

Usually, patients themselves are very much encouraged from the outset. At the end of about two weeks there is a distinctly noticeable improvement in the coordination of movements which they have been practising, and this improvement continues for some time, until a certain stage of coordination, dependant on the extent of the disease, is reached. Whatever is gained remains as long as the disease itself remains stationary. Further progress of the disease will demand renewed education of the muscular sense, and at times their progress in coordination will render latent the advance of the sclerotic process in the cord.

For the more exact coordinate movements required of the hands, such as writing, for example, much finer and more detailed exercises are required. It is surprising to see, however, how much improvement may be obtained in handwriting after a careful course of exercises in tracing various curved, spiral, and angular figures. In other relatively delicate movements for ataxics, such as grasping small objects, buttoning clothes, etc., the same improvement is noticeable after a course of exercises directed more especially to these ends, such as grasping at a given signal variously colored swinging balls, or picking out variously sized objects from a number scattered over the table.

As to the cases in which the treatment, when applicable, does not succeed (and they are rare), they are mainly those in which the intensity of attention required to direct the movements through the diseased nerve-fibers is too great for the patients to accomplish the effort demanded

of them. Dr. Fränkel points out that they are almost always people who have been characteristically awkward in their preataxic life, and whose general muscular sensibility is supposedly congenitally impaired, capability for delicate movements being the nice adjustment between muscular sense and muscular motility.

In a certain number of cases the treatment is distinctly contraindicated. In acute tabes, where the pains are almost continuous, it would do harm rather than good, and when tried has always led to aggravation of symptoms. In patients suffering from arthropathies it is also contraindicated, or where for any reason there is suspected to be present that abnormal friability of the bones that causes so-called spontaneous fracture. Where severe vesical trouble exists, with a tendency to frequent recurrence of vesical crises, absolute tranquility is the only thing for the patient. Any amount of movement leads inevitably to aggravation of the extremely troublesome symptoms.

While putting the large number of tabetic patients that he has had through the movements Fränkel has found and described an additional symptom of tabes. It is the muscular relaxation that enables tabetic patients to put their joints in positions of hyperextension and hyperflexion that are impossible to normal persons. The hyperextension at the knee that gives tabetics the backward curve to their legs when extended has often been noted. A similar state of the muscles around the hip-joint and in the leg below it enables tabetics to place their legs at full length and without flexion of the knee in parallelism with the trunk, or at least in a state of flexion, that is far beyond normal. Here in France, where symptoms are invariably connected with their discoverer's name, this condition of affairs is known as the Fränkel symptom, or muscular hypotonia. Its discoverer claims that it exists in the preataxic stage in a noticeable degree, and that it may be a valuable symptom of the incipency of the disease.

The whole of Fränkel's work seems to bring out clearly the truth of what Marie stated so frankly in a lecture on tabes not long ago. Those who regard tabes as a disease, whose nosography is definite and determined, are reckoning without the suggestive developments that are constantly arising in connection with it. Fränkel's book, which I believe is soon to appear in German and French, will be welcomed by those who realize that it may shed new light on the practical side of the most interesting of nervous diseases.

Something about other therapeutic measures that are employed here in the treatment of nervous diseases may be of interest to the readers of the MEDICAL NEWS. Motchutkowski's suspension treatment for tabes is spoken of in terms of highest commendation on all sides. In certain cases it gives really marvelous results. The pains are rendered less severe and less frequently recurrent, the incoordination often becomes less noticeable, sexual potency returns, especially in young subjects, and the further progress of the disease seems to cease, at least for a time. At the Salpêtrière, by carefully limiting the length of the *séances* according to the patient's sensations, and only lengthening them very gradually by not allowing their too frequent repetition, and by avoiding entirely

the application of the treatment in cases where there is serious heart disease, or considerable obesity, or where the patient experiences a painful sense of giddiness during or after the suspension, the serious results that have sometimes been reported from the treatment are never seen.

For the pains of locomotor ataxia a combination of phenacetin and antipyrin has been found more serviceable and productive of less annoying counter-symptoms than either of the drugs alone. Here no other drug is given or has been found of any use in tabes, though at Queen's Square Hospital for Nervous Diseases in London I found the use of chlorid of aluminium in 3-grain doses considered to sometimes lessen the troublesome symptoms of the disease and retard its progress. One is reminded of the oft-reported good derived from its chemical congener, the berated and overrated chlorid of gold and sodium in America.

## SOCIETY PROCEEDINGS.

### THE NEW YORK ACADEMY OF MEDICINE.

*Stated Meeting held Thursday Evening February 18, 1897.*

The President, EDWARD G. JANEWAY, M.D., in the Chair.

A paper entitled

#### THE USE OF MODIFIED MILK IN HEALTH AND DISEASE

was read by THOMAS M. ROTCH, M.D., of Harvard University. (See page 417).

#### DISCUSSION.

DR. J. P. CROZER GRIFFITH, of Philadelphia, said that he felt out of place in discussing a subject which had been given such thorough and scientific study by the author. He was an advocate of laboratory modified milk and believed it should be more generally used, and that great credit was due the Walker-Gordon laboratory for the good work they were doing in Boston. A few years ago a Jewish society had established in New York a bureau for distributing sterilized milk among the poorer classes, in imitation of a similar place in Philadelphia. This, of course, was a benefit to the poor in supplying them with pure milk, and was an excellent method in the absence of any more accurately prepared milk, but, naturally, this had its definite limits and no very astonishing results were obtained from it—nothing like those which were obtained by the Walker-Gordon laboratory in Boston.

When good results are not obtained from the use of modified milk as an artificial infant food, it was because the individual child was not sufficiently studied. Most physicians prescribed modified milk according to the age of the child, without any reference to what the child needed, and, in many instances, without even seeing the child. He agreed with all that Dr. Rotch had said. The first and most important point was the careful study of percentages in regard to an individual case. It could not be properly prepared at home. Most physicians do not,



as a routine practice, carefully inspect and test the milk and cream used in feeding babies artificially, as is done in the laboratory; they do not know how much fat and how much proteids the baby is getting; they do not know whether or not the milk is clean, or whether or not it comes from a healthy cow. Most young infants require less proteids than is generally supposed. The three great factors in infant feeding are: (1) Quality, (2) quantity, and (3) the idiosyncrasy of the child. A combination which agrees with one child, does not agree with another. A case was recalled in which the mother of twins had tried to give the same food to both babies, with the result that one thrived and the other failed.

Commercial infant foods should not be given as a routine method of feeding, although he did not wish to be understood as saying that they were never to be employed, for he had known children whose lives had been saved by them. As to the question of weaning, he believed in doing it slowly and in the manner described in the paper.

DR. A. JACOBI observed that the views of the author, as expressed in the paper, differed somewhat from those expressed in the past, especially in regard to a certain diminution of proteids. He thought it well to learn more and more about calculations and percentages, but, at the same time, it should not be forgotten that a baby is not a test-tube or a crystal, and that in feeding it we are dealing with an organic being in which changes are constantly occurring. We know what will take place in a test-tube, but do not know what will take place in the stomach of an individual. Therefore, while appreciating the usefulness of calculation and percentages, he did not rely upon these solely. Nor did he believe that the addition of cereals resulted in the formation of large curds, for in his experience it caused the opposite effect. He agreed with the author that as nearly as possible the elements of breast-milk should be adhered to, and also that these constituents could be found in cow's milk. These constituents should be given in certain well-defined forms, in accordance with the child's power of digestion. Mother's milk, the ideal food, sometimes contained eight, ten, or even twelve per cent. of fat, the amount varying at different times, and sometimes being as low as five or six per cent. Nature allowed a good deal of latitude in this matter. He doubted whether exact calculations were absolutely necessary. He felt sure that a great deal of good would be done by the author's combinations and modifications, but was equally certain that just as good results would be reached by other methods.

DR. L. EMMETT HOLT thought the question of infant-feeding a very complicated one, so complicated that one could not expect to get the best results without expending a great deal of time and labor and attention on each individual case, no matter what method was employed. No one disputed the fact that the best food for infants was mother's milk, and, if this was not available, the nearest approach to it was next best. We naturally turn to cow's milk, for the reason that nature has taught us that young mammals need fresh milk in order to develop properly. But in cow's milk we do not find the proper proportion of fat and sugar and proteid, and, therefore, we have

always modified it. Whether this has been done accurately or approximately is a matter of doubt. Some infants digest cow's milk without modification. A baby that has been badly fed for months must be very differently managed from one that is taken in hand early. In the average case it was better to adhere strictly to the milk elements, increasing the proportion of the constituents from time to time, but in pathological cases it would be found that this rule would not hold. In such cases the unexpected was likely to happen. He had seen sickly infants thrive on condensed milk, and others do well on rice-water, and had come to the conclusion that the management of each case must be worked out individually. In most cases the best food was cow's milk modified only by changing the proportion of the elements. Some babies absolutely required a wet-nurse.

In regard to the proportion of fat and sugar and proteids, very few children had difficulty in digesting sugar of milk, and he thought the secret of success was in getting the proteids down to where the child could digest them in the very beginning. This was sometimes as low as one-fourth of one per cent. The almost invariable mistake was to give too much fat, particularly in children three or four months old. Many children who had been given too much fat immediately picked up when put on condensed milk, in which the percentage of fat and proteids is low.

DR. ALLEN M. THOMAS said that he had become enthusiastic upon the subject of modified milk when he had first heard of it from Dr. Rotch, because it appealed at once to his common-sense and intelligence, and had at once set out to learn something about it. He had found it a very difficult matter, and had at times been very much discouraged, but still used it, and had come to hear the paper in the hope of being instructed. He was decidedly of the opinion that mother's milk was the best food for an infant, and if the mother was not able to supply it, a wet-nurse was the next best thing in the early months, provided that one could be obtained whose milk suited the baby. This not being available, he would use modified milk, as this seemed to him the best of all artificial foods, increasing the percentage of the elements, as Nature taught us to do, as the child grew older. He was heartily in favor of laboratory milk, because it was pure and more scientifically prepared than it could be done at home.

DR. W. P. NORTHRUP said that as far as the modification of milk was concerned we had *always* been modifying milk for the artificial feeding of babies. Although, as Dr. Jacobi had said, a baby was not a test-tube or a crystal, when milk was modified, and modified correctly, the baby would digest it. His experience had been that the feeding of one case taught little in regard to feeding another case; in other words, each child had to be studied individually. The proportions of fat, sugar, and proteids should be kept pretty well in sight and carefully studied. For instance, some babies were always cold and blue, and these required a higher percentage of proteids than others. He felt convinced that by the use of modified milk he had been instrumental in saving the life of several children



who were rapidly going to their death. One great advantage of the Walker-Gordon modified milk was that it could be depended upon. It was good, pure, fresh milk, scientifically prepared by experts in clean surroundings and much preferable to that which was prepared at home in the kitchen. He was fully in accord with the author in regard to the importance of exact percentages, and wished to thank Dr. Rotch, personally, for the work he had done in this line. Many delicate children would grow up and look upon him as a benefactor.

DR. JOSEPH E. WINTERS said that as all we knew of infant feeding was derived from our knowledge of the true composition of breast-milk, we were indebted to Dr. Arthur Meigs, who, ten or fifteen years ago, made an elaborate study of the elements of woman's milk. Up to that time nothing was known of artificial infant feeding, and, but for Meigs' investigations, we would be as much in the dark as we were then, and yet it was a fact that those who speak and write upon the subject purposely ignore the part Dr. Meigs took in teaching us that woman's milk contained but about one per cent. of proteids. Up to that time it was said that there was some undiscoverable difference between cows' milk and breast-milk. We now know that the difference was simply one of percentage. Much had been said about milk modified in the laboratory and milk modified at home. There could be no doubt that laboratory milk was always preferable, but he thought that the laboratory could not stand alone. There should be behind it a physician who understood the modification of milk and who knew how to prescribe it. He had recently seen an infant with a perfectly developed scurvy, and this infant had been fed on modified milk which came from the Walker-Gordon laboratory. However, it was only fair to say that the child made a full recovery on Walker-Gordon modified milk without a dose of medicine. He thought one could not go far wrong in prescribing modified milk if he followed the rules laid down in Meigs' book, published in 1888, although his teachings antedated that by several years.

DR. MABBOTT said that in 1895, while he was at the Nursery and Child's Hospital, modified milk had been used extensively, but with not very good results, the death-rate of that year being 30.8, whereas the average for the preceding ten years was 25.7. Of course, this was among the entire number of children in the institution, some of whom were breast-fed, and it should be remembered, too, that this hospital kept its own contagious cases. In his opinion, the reason why the results were not better was because in so large an institution it was impossible for the physician to make individual studies of the cases. In private practice, when a mother could not nurse her baby, he advised a wet-nurse; the second choice being the Walker-Gordon modified milk. He thought the entire community should be grateful to such men as Dr. Rotch and Dr. Holt for the work they had done in trying to solve the problem of infant feeding.

DR. ROTCH, in closing, referred to what had been said in the discussion about wet-nurses, and said that, in his opinion, a wet-nurse should be employed only when nothing else could be done. There were wet-nurses and wet-nurses. Much work had been done in modifying breast-milk, for breast-milk did not agree with many babies and the idea that it did was erroneous. He said that he was familiar with the work Dr. Meigs had done in investigating the composition of breast-milk, but thought that at this day we would be going backward if we advocated the Meigs' mixture.

## IN MEMORIAM.

THOMAS HERRING BURCHARD, A.M., M.D.,  
OF NEW YORK.<sup>1</sup>

By J. BLAKE WHITE, M.D.

DR. THOMAS HERRING BURCHARD was born in the City of New York, March 19, 1849. He was the eldest son of the late Rev. Samuel D. Burchard, who for half a century was a distinguished minister of the Presbyterian Church in New York. Dr. Burchard's mother was Agnes M. Dilks, a woman of rare accomplishment, culture, and refinement.

In the year 1869 Dr. Burchard graduated from the College of the City of New York, being one of the dissertationists at commencement. During his college curriculum he was noted as a declaimer and ready writer, qualities which matured in later years into ripe literary culture. After graduating he commenced the study of medicine under the guidance of Dr. Lewis A. Sayre, taking his medical degree from Bellevue Medical College in the year 1872. The *ad eundem* degree of A.M. was conferred upon him by his Alma Mater during the same year. He served as house physician at Bellevue Hospital, and at the expiration of his term of service he filled the position of demonstrator of anatomy at the Bellevue College. Subsequently he received the appointment of attending surgeon at the New York Dispensary, and was made Lecturer on Surgical Emergencies at the Bellevue Medical College, which position he filled most acceptably to the time of his decease.

In 1880 Dr. Burchard was appointed one of the visiting surgeons to the Charity Hospital. At the time of the first organization of the Civil Service Commission in the State and City of New York, he was made chairman of the board of examiners for appointments to hospitals.

As a writer, Dr. Burchard was fluent, logical, and complete. As a critic, he was conscientious, forceful, and discriminative. He never turned his pen into a bludgeon to wantonly wound, or made it the instrument to advance unworthy purposes. To rivals, he was always just and generous. To aspirants for distinction, he was unfailingly helpful and considerate.

To know him once was to appreciate him always—an appreciation which subsequent meetings served to strengthen. Though not a zealous churchman, he entertained simple and earnest religious views. He rested upon a sincere acceptance of the tenets of the Christian faith as taught by the church he venerated. So lived he, that he might be ready to die with steadfast hope of the everlasting promise.

About two years ago he sustained a painful bodily injury, the result of accident, which necessitated his retirement for a time from active practice and he went abroad to recuperate. Upon his return to New York he settled at No. 53 West Fifty-second street. He was scarcely yet established in his new home when sad summons to the lasting and dreamless sleep overtook him. The indomitable will-power of Dr. Burchard, quickened by a conscientious devotion to his exalted calling, always sustained him, so that, like a true knight errant of philanthropy, he ardently pushed forward in the line of duty, as he construed it, and continued to render professional services while he himself was in far greater need of care than many applicants for his skill.

<sup>1</sup> Abstract of paper read before the Northwestern Medical and Surgical Society, New York, December 16, 1896.